REPORT RESUMES

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INSTRUCTIONAL TELEVISION RESEARCH PROJECT NUMBER TWO. AN EXPERIMENTAL STUDY OF COLLEGE INSTRUCTION USING BROADCAST TELEVISION.

BY- LEPORE, ALBERT R. WILSON, JACK D.
SAN FRANCISCO STATE COLL., CALIF.
STATION KQED, SAN FRANCISCO, CALIF

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THE RESULTS OF THE SECOND YEAR (1957-58) OF AN EXPERIMENT IN OPEN CIRCUIT INSTRUCTIONAL TV ARE REPORTED. THE OBJECTIVE WAS TO COMPARE PERFORMANCES AND ATTITUDES OF 3 GROUPS OF STUDENTS--(1) TV INSTRUCTION AT HOME, (2) TV INSTRUCTION ON CAMPUS, (3) CONVENTIONAL INSTRUCTION ON CAMPUS. THE EFFECTIVENESS OF OTHER TEACHING METHODS, DISCUSSION, DEMONSTRATION, AND LIBRARY ASSIGNMENTS, WAS ALSO CONSIDERED. ALL GROUPS WERE TAUGHT BY ONE PROFESSOR. STUDENT POPULATION INCLUDED REGULAR COLLEGE STUDENTS, SELECTED HIGH SCHOOL STUDENTS, SELECTED PRISON INMATES, AND ADULTS AT LARGE. COLLEGE COURSES IN SCIENCE, PSYCHOLOGY, SOCIAL SCIENCE, ENGLISH, AND CREATIVE ARTS, PREPARED BY SAN FRANCISCO STATE COLLEGE PERSONNEL, WERE BROADCAST OVER KQED. CONTROL MEASURES USED WERE ACADEMIC APTITUDE, GRADE POINT AVERAGE, CONTENT ACHIEVEMENT, AND MOTIVATION. RESULTS SHOWED THAT ACADEMIC GAINS OF STUDENTS TAUGHT BY TV COMPARE WELL WITH THOSE OF CONVENTIONALLY TAUGHT STUDENTS IN ALL SUBJECTS BUT CREATIVE ARTS. STUDENTS GENERALLY ACCEPTED TV AS AN INSTRUCTIONAL MEDIUM. HOME VIEWERS WERE MORE POSITIVE THAN CAMPUS VIEWERS. SUGGESTIONS ARE MADE FOR THE EFFECTIVE USE OF INSTRUCTION VIA TV IN COLLEGES. COST DATA ARE GIVEN. (MS)

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A

Instructional Television Research

PROJECT NUMBER TWO:

EM 000523

An Experimental Study of College Instruction Using Broadcast Television

SAN FRANCISCO STATE COLLEGE

Project Sponsored by
The Fund for the Advancement of Education

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Instructional Television Research

PROJECT NUMBER TWO

An Experimental Study of College Instruction Using Broadcast Television

Albert R. Lepore and Jack D. Wilson
In Collaboration With
Shepard A. Insel and Michael Powell

Project Sponsored by
The Fund for the Advancement of Education

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and

SAN FRANCISCO UNIFIED SCHOOL DISTRICT
HIGH SCHOOLS

BALBOA
CONTINUATION
GALILEO
ABRAHAM LINCOLN
LOWELL
MISSION
POLYTECHNIC
GEORGE WASHINGTON

Their participation made this study possible.

Summary of Aims and Results

The major purpose of this study was to explore further the offering of General Education courses to regularly enrolled college students using open-circuit instructional television. The courses were representative of six major academic areas, and included Biology, Creative Arts, Economics, English, Physical Science, and Psychology; each course was adapted to the television medium. The experimental designs allowed comparisons of performances of students in three main groups, Television at Home, Television on Campus, and Conventional on Campus. In Creative Arts, Economics, and Psychology, experimental groups watched two weekly telecasts and met the equivalent of one hour per week for discussion or laboratory. In the Science courses, experimental groups viewed three telecasts per week. Further, each main group was divided into four supplementary educational procedures allowing for comparisons among weekly discussion, bi-weekly discussion, weekly demonstration-activity, and home and library assignment (no discussion groups). Control and experimental groups were taught by the same instructors; in all courses, except Economics, additional faculty were used as discussion leaders.

Five broad areas of investigation were delineated; the areas and major results in each follow:

Area I: College Students — Objective Appraisal

The objective of this area was to compare performances of college students on various tests and measures.

Achievement

1. Students who received instruction via television compared favorably with students who received conventional instruction with respect to acquisition of information or, as in the case of English, the ability to write an essay.
2. Students, whether of high or low academic ability, acquired information as well by television as by conventional instruction.
3. The various amounts of supplementary instruction (weekly discussion, bi-weekly discussion, demonstration-activity, home and library assignment) were equally effective in promoting factual learning.

Self-Insight and Critical Thinking

1. There were no statistically significant differences between television and conventional groups with respect to improvement in self-insight and in critical thinking.
2. In Science courses, critical thinking and self-insight were about as effectively promoted by one of the four supplementary kinds of instruction as by any one of the others.

Attitudes to Course Content and Instructor

1. Seventeen of the nineteen Television at Home, Television on Campus, and Conventional groups gave favorable ratings to course content and to instructors, but Television on Campus groups had less favorable attitudes than the other two groups.
2. Among the supplementary discussion groups in Science courses, there were no statistically significant differences on attitudes to course content and to instructors.

Interest in Subject Matter

There were no significant differences in interest level between Television at Home and Conventional groups but there were differences between these groups and Television on Campus. The latter usually expressed a lesser degree of interest.

Attitude to Television

1. Television was accepted as a medium of instruction by a majority of students who experienced a televised course. The results on an attitude to television scale indicated that seven of ten groups were either favorable or neutral in their attitude. If assured of a superior instructor in an hypothetical television course, the range of student preference for televised instruction was from a low of sixty-four per cent in one group to a high of eighty-seven per cent in another.
2. In Physical Science, a behavioral choice check indicated eighty-one per cent of Television at Home Students chose to take Biology on television the next semester; and fifty-seven per cent of Television on Campus students decided in favor of Biology on television.
3. Television at Home was preferred to Television on Campus in three of four courses that had both kinds of television groups.

Selected Opinions Toward Television

Generally, the students in Conventional groups when compared to students in Television groups indicated they had learned more, had paid better attention, had more personal contact with instructors, and had prepared better for class.

Friendship Study

Conventional groups, as expected, fostered friendships more frequently than did television groups.

Area II: High School Students — Objective Appraisal

Selected high school students were matched with college students, and their performances on measures of achievement and attitudes were compared.

Achievement

Selected high school students made smaller mean gains than comparable college students.

Attitudes to Course Content and Instructor; Interest in Subject Matter

High school students evidenced favorable attitudes to course content and instructors; they indicated high interest in subject matter. In English, high school students' attitudes to content and instructors and interest in subject matter were more favorable than were those of college students. In Science, both groups held positive attitudes and interests, but these were not significantly different from each other.

Attitude to Television

1. In English, high school students expressed somewhat negative attitudes to television, but these attitudes were less negative than the attitudes of college students in the Television on Campus group with whom they were compared.
2. In Science, high school students' attitudes to television were positive; college students in Television on Campus expressed negative attitudes.

Area III: The Follow-Up Study

Students who had taken the first half of freshman English by television in the Spring, 1957, and who enrolled in conventional sections for the second half of English were anonymously queried concerning their feelings toward the two modes of instruction.

1. Eighty per cent of the students preferred conventional English instruction because it allowed greater learning, it was more interesting and enjoyable, it provided more individual attention and personal contact with the instructor; and it furnished more highly significant content.
2. The findings in the Follow-up Study were consistent with the attitude studies from the previous semester.

Area IV. Attitudes Toward the Teaching-Learning Process

This section explored aspects of the teaching-learning process, namely, in what ways are televised and conventional instruction similar and dissimilar, apart from acquisition of information?

1. Analysis of student and teacher statements describing instruction revealed that students and teachers agreed on a common core of incidents that constituted effective and ineffective instruction. Further analysis indicated that there were more effective and ineffective incidents in conventional instruction than in televised instruction.
2. Students in both televised and conventional classes felt that what the teacher said or did was highly important but reacted negatively to the teacher's behavior more often in conventional instruction than in televised instruction.
3. Student attitudes toward teaching-learning varied from one learning context to another: Students placed more importance on what the teacher did in televised instruction than in the conventional classroom and gave more value to student participation in conventional instruction than in televised instruction.
4. Although something of value apparently was found in both televised and conventional teaching-learning situations, televised instruction was perceived as allowing fewer kinds of satisfactions and dissatisfactions than did conventional instruction.

Area V: Administration, Production, Cost Analysis

This section explored problems in administration, production, and cost of open-circuit instructional television.

1. Experience suggests that instructional television appears to be best placed within the administrative organization of the instructional area of the college.
2. It was demonstrated that the College and a local educational television station could work closely and cooperatively to present quality televised courses. Moreover, it was demonstrated that instructors can maintain control over the academic quality and content of televised courses and can, in cooperation with a regular faculty producer-director, offer quality-produced live television courses.
3. Analyses of cost data, based as they were on experimental, quality-produced, open-circuit television, allowed three statements:
   - a. It is economically feasible to offer lecture-discussion courses by television if enrollments of about 950 students are attainable;
   - b. More expensive courses become feasible when a minimum of 1,440 students are available.
   - c. The cost of televised instruction, after initial costs have been met, may be reduced for subsequent semesters and break-even points may be lowered.

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Research, on the scale of the study reported here, requires the help of many people and agencies. Since the research was conducted within the existing program of the College, most of the College's instructional and administrative areas were more or less affected by the Television Research Project's activities. Moreover, not only did the Project necessarily make demands on College and public school offices for services, it went further: It caused changes to occur in the operation of a number of offices in order to accommodate the Project. In other instances, individuals gave their time, experience, and enthusiasm in order that the research be facilitated. We, who worked within the Project proper, take this opportunity to acknowledge the following individuals and their staffs:

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William C. Charleston, Chief of Maintenance

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Edward H. Redford, Assistant Superintendent in Charge of Senior High Schools
Morris Williams, Coordinator of Secondary Education
Louis Alcorta, Curriculum Assistant

KQED, San Francisco —

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Philco Corporation —

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PROJECT PERSONNEL

Project Director — Albert R. Lepore
Project Evaluator — Jack D. Wilson
Administrative Coordinator — Willard L. Leeds
Area IV Evaluator — Shepard A. Insel

TEACHING STAFF:

Creative Arts 10

— Richard Glyer, drama
Louis Huber, music
Aileen Kelly, art
Welland Lathrop, dance

English 6.1

— Mark Linenthal, Jr.
Discussion Leader: Albert T. Anderson

Psychology 10.1

— Morton J. Keston
Discussion Leader: John T. Palmer

Science 10

— Carlos S. Mundt
Coordinator: Maurice R. Amsden
Discussion Leaders: Maurice R. Amsden
Robert T. Blackburn
Ralph M. Lakness
Carlos S. Mundt
James S. Perlman
Robert A. Thornton

Science 11

— Lawrence W. Swan
with Joel F. Gustafson and York T. Mandra
Coordinator: Joel F. Gustafson
Discussion Leaders: Paul B. Bedesem, Jr.
Jean C. Dofflemoyer
Joel F. Gustafson
Joseph G. Hall
John S. Hensill
James P Mackey
Lawrence W. Swan

Social Science 30

— Thomas P. Lantos

Production Director — David Parker; Michael Powell

Graphic Artist — Selma Burgess

Office Manager — Barbara Rudy

Project Secretary — Charlene Johnson

Production Secretary — Janet Karesh

Production Assistants:

Donald Dulmage
Jerry Motta
Ronald Smith
Barbara Toffelmier
Kenneth Winslow

Research Assistants:

Gloria Beatty
Richard Brody
Fred Chapman
Clarence Crockett
Thomas Jones
Kurt Schlesinger
Richard Williamson

Teaching Assistants:

Creative Arts 10 — Sandra C. Gustavson
English 6.1 — Gerald Levin
Psychology 10.1 — Joan Valdes
Science 10 — Irwin Miller
Science 11 — Frank R. Giofalo
Social Science 30 — Terrence M. Van Becker

Staff of Station KQED:

Station Manager — James Day
Program Director — Jonathan C. Rice
Production Manager — Gerald Marens

Chief Engineer and Technical Director — Robert J. Nissen

PARTICIPATING PERSONNEL

SAN FRANCISCO UNIFIED SCHOOL DISTRICT

San Francisco High School Principals:

Ralph Keuer — Balboa
Frank P. Conklin — Continuation
James C. Morena — Galileo
Joseph B. Hill — Abraham Lincoln
J. A. Perino — Lowell
E. K Frederick — Mission
Ivor F. Galloway — Polytechnic
Otto I. Schmaelzle — George Washington

San Francisco High School Teachers:

Balboa —

Robert Brandeberry
Josephine Cole
Edith Trickler

Continuation —

George C. Mergens

Galileo —

Gordon Carlson
Donald Ewing
Eugene Grundt

Abraham Lincoln —

Lloyd Baskerville
Edna McIntyre
William Manahan

Lowell —

Sam Carpenter
Margaret Heaton

Mission —

Mary Lins

Polytechnic —

Vincent Leonard
Robert Lombardi
Gene Roberts

George Washington —

Melanie Amesworth
Bruce Hannah
Edwin Knapton
Margaret Poole

INTRODUCTION

This report is the result of a second year (1957-58) of experimentation with open-circuit instructional television in general education. Although the first report[1] made clear that open-circuit television was feasible, certain limitations of one year of study were indicated: (1) One year of experimentation was believed to be too brief a period for assessment of important aspects of the study; (2) A broader sampling of general education courses, particularly science, was necessary.

The second year of study was, in some respects, a continuation of the first year. Evidence for this is the similarity of the major research objectives for the two years. Major objectives for 1957-58 were:

1. To compare the performance of students in six general education courses as normally presented on the campus with student performance in the same courses especially prepared for presentation using the television medium.
2. To study the relationship of such factors as ability level, achievement, motivation, and critical thinking, to student performance in the courses.
3. To evaluate the effects upon the instructional staff of preparing and presenting telecourses.
4. To evaluate attitudes towards television as an instructional medium.

In addition to these research objectives, data and observations were obtained concerning:

1. The performance of high school students who elected to take the telecourses.
2. The cost, administration, and production of telecourses.
3. The implications for the College of presenting courses by television.

Two other resemblances with the initial year of research were: (1) Four courses were repeated (Psychology, English, Economics, Creative Arts); (2) Portions of the design and certain evaluation instruments were re-used. However, the second year did differ from the first year. The nature of the changes were:

1. The study was expanded to include, in two five-unit courses, all required general education natural science.
2. Increased attention was given to the performance of high school students, although this was an ancillary aspect of the study.
3. An exploration was made of attitudes towards the teaching-learning process as it related to television and conventional instruction.
4. Attention was directed to the continuing effects of a second year of instructional television.

The organization of this report differs in some respects from the usual pattern of research reports. This was done deliberately. The assumption was made that motives of persons reading the report would differ and that not all would read the entire work. An attempt was made to prepare much of the report in a way that would permit the reader to turn readily to a selected problem and get an adequate (not complete) statement of the problem, the method, and the results. The selective reader will be helped to find what he seeks by turning to Part II, which develops each research area of the study, states each problem, describes the related evaluation instrument or procedure, and outlines the method of analysis. The results, Part III, are arranged to correspond with Part II.

The complete report is divided into four parts. Part I describes the nature of the experiment; Part II develops the problems and the evaluation methods; Part III presents the results including data on administration, production, and cost analysis; and Part IV relates the implications of the study to the College.

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[1] Dreher, R. E. and Beatty, W. H., Instructional Television Research, Project Number One: *An Experimental Study of College Instruction Using Broadcast Television.* (Project Sponsored by The Fund for the Advancement of Education; Project Conducted by San Francisco State College through the facilities of Station KQED, Channel 9, San Francisco, California, April, 1958), p. 8ff.

PART ONE

The Nature of the Experiment

The nature of the study imposed certain limitations on the experiment. (1) Research purposes centered on certain curricular and administrative problems; these were mutually agreed on by the College and the grantor. (2) Since open-circuit telecasting is costly and implies a mass audience, officers of the College were persuaded to look to the multiple section courses in lower division general education with their large total enrollments as suitable for the experiment. (3) The form of the experimental design was largely set by the need for data derived from the performances of "matched groups." (4) Finally, the students were volunteers.

Specific Purposes. The main purposes of the experiment were five in number.

1. To estimate the relative efficacy of three media of instruction:
    1.1 Television at Home
    1.2 Television on Campus
    1.3 Regular Campus Instruction
2. To estimate the relative efficacy of four supplementary avenues of instruction:
    2.1 Weekly two-hour Discussions
    2.2 Bi-Weekly two-hour Discussions
    2.3 Weekly Demonstration—Activity Periods
    2.4 Home and Library Assignments (No Discussion Sessions)
3. To get evidence bearing on the feasibility of successfully teaching college courses to high school students.
4. To explore attitudes toward the teaching-learning process.
5. To describe the administration and production of the Project and to estimate the cost of open-circuit instructional television in an experimental setting.

The Courses. Six courses were included in the experiment, three in the Fall Semester 1957, and three in the Spring Semester 1958. All six are required courses in the 45-unit general education program. The courses and instructors were:

COURSE	INSTRUCTOR
1. Science 10—Selected Topics in Science (Fall semester—5 semester units)	Carlos S. Mundt
2. Psychology 10.1—Personal, Social and Occupational Development (Fall Semester—3 semester units)	Morton J. Keston
3. Social Science 30—Contemporary Economic Society (Fall Semester—3 semester units)	Thomas P. Lantos
4. Science 11—Man on Earth (Spring Semester—5 semester units)	Lawrence W. Swan
5. English 6.1—Basic Communications (Spring Semester—3 semester units)	Mark Linenthal, Jr.
6. Creative Arts 10—Fundamentals of Creative Arts (Spring Semester—2 semester units)	Richard T. Glyer Louis D. Huber Aileen F. Kelly Welland Lathrop

The Experiment. The experimental design varied from course to course. In English 6.1, Psychology 10.1, and Science 10 and 11, there were three main groups:

1. An experimental group that took the course by Television at Home.
2. An experimental group that took the course by Television on Campus in a classroom with 25 to 30 students.
3. A Control group that took the course by regular campus instruction.

In Creative Arts 10 and Social Science 30 there were only two main groups; in each case there was no Television on Campus group.

The Television and Control groups for Psychology, English, Creative Arts, and Social Science pursued the same course objectives, used the same texts, had the same assignments and supplementary readings, and took the same course examinations. The experimental groups received instruction via two 45-minute television lectures weekly, plus one hour (50-minute) On-Campus discussion or its equivalent. The Control groups were taught via regular classroom lectures and discussions, three hours per week. In every case, the same instructor taught both the Television and the Control groups and, with one exception, served as leader in the discussion sessions. The one exception, the discussion period associated with On-Campus Television, was scheduled as a 25-minute session twice weekly immediately following the television program; consequently, the television lecturer could not participate.

The pattern for Science 10 and Science 11 was essentially the same, but with variations in the kind and the amount of supplementary discussion. For the experimental groups, the main avenue of instruction was three 45-minute television lectures and, for the Control group, three regular classroom lectures. The same professor taught on television and in the Control class. In each of the three main categories (Television at Home, Television on Campus, and Control), there were four sub-groups:

1. Discussions Weekly for two hours.
2. Discussions Bi-Weekly for two hours.
3. Demonstration-Activity Periods Weekly for two hours.
4. Home and Library Assignments (no group discussions).

Discussion leaders were selected from the regular faculty, six in Science 10 and seven in Science 11. Insofar as possible, a given discussion leader was placed in charge of two sections, one a Television class and the other a Control Class.

Several additional groups received televised instruction:

1. High School Students
    In the Spring Semester 1958,[1] English 6.1 was offered by television in seven San Francisco high schools, and Science 11 in five schools.

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[1] Data for the Fall Semester 1957 were incomplete; they are not included in this report.

2. Inmates at San Quentin
   Three courses, Science 10, Science 11, and Psychology 10.1 were offered by television to inmates at San Quentin Prison. (See Appendix A for results.)
3. Extension Students
   All courses were offered for credit through the Extension Division of the College.

College Students. The 1261[1] college students were volunteers and regularly enrolled students. The majority of the students, 863, were freshmen. The reason for this was that four courses, Psychology 10.1, Science 10 and 11, and English 6.1 are normally taken in the freshman year. In the experiment, these four courses included over one-half of the freshman class of about 900 students. In addition to the freshmen, 398 other regular students were enrolled in Social Science 30 and Creative Arts 10. Social Science 30 usually is taken in the sophomore year; Creative Arts 10 may be taken any year.

Comparability of College Groups. The problem of assigning such a large number of persons to classes, sections, and sub-sections, made impossible a complete randomization of assignment. For example, the Television at Home groups had to be drawn not from the total number of willing participants, but from students who had television sets, who received KQED's signal, and who had class and commute schedules which enabled them to be home at the time of the telecasts. However, the assignment of students to Control and On-Campus Television groups, with few exceptions, was random; further, the assignment to discussion sections in Science 10 and Science 11 was mainly random. As a result, comparability of groups was estimated after the groups were formed.

Checks on initial comparability were made via the following instruments:

1. School and College Ability Test (S.C.A.T.)
2. Watson-Glaser Critical Thinking Appraisal[2]
3. Individual Inventory[3]
4. Pretest in Content[4]
5. Edwards Personal Preference Inventory

On each instrument the difference between the means of the various groups in each course were tested by analysis of variance. In the case of the first four instruments, the F-ratios for all six courses, with the single exception of the pretest in English 6.1, were such as could result from chance differences in the means of the various sub-groups (see Appendix B). Thus, in intelligence, as measured by S.C.A.T., in critical thinking ability, as measured by Watson-Glaser, in self-insight, as measured by the Individual Inventory, and in knowledge of subject-matter, as measured by pretests in content, the various sub-groups were judged to be comparable.

A further check was made via the Edwards Personal Preference Inventory. This instrument provides a quick and convenient measure of fifteen relatively independent normal personality variables:

1. Achievement Drive
2. Deference
3. Order
4. Exhibition
5. Autonomy
6. Affiliation
7. Intraception
8. Succorance
9. Dominance
10. Abasement
11. Nurturance
12. Change
13. Endurance
14. Heterosexuality
15. Aggression

An analysis of variance was computed for each variable in each course. Of the 150 F-ratios so obtained (see Appendix C), 142 were non-significant, 8 were significant at the five per cent level, none at the one per cent level. Thus, the results from the Edwards Personal Preference Inventory furnished additional evidence that the Experimental and Control groups were initially comparable.

However, despite the apparent comparability of the Experimental and Control groups in all courses, it seemed advisable to employ an analysis of covariance to test for the presence or absence of differences among the groups with respect to achievement on the final examinations. To control on individual differences in aptitude and ability, the School and College Ability Test raw scores were used as a scholastic aptitude control, the high school recommending units or college grade point averages were used as a prior achievement control, and a pretest in content was used as a current achievement control.

High School Students. The nature of high school groups varied from school to school. In some cases, high ability students were chosen; in other cases, volunteers were accepted. Most of the 350 students were seniors; the remainder were high juniors. Inasmuch as the resulting groups were not comparable, at the outset, with college On-Campus viewers and, since it was desired that the groups be compared, it was necessary to match the groups on the basis of S.C.A.T. scores before making achievement comparisons. In English 6.1, two high school students were matched with each college student; in Science 11, the matching was one-for-one. When matched on S.C.A.T., the English 6.1 groups were found to have comparable mean scores on the Cooperative English pretest, and the Science 11 groups had comparable means on the content pretest.

Teaching-Learning Groups. The population used for the study of teaching-learning processes was the same as for the experiment. Three subject groups were used for the study of attitudes toward the teaching-learning process, namely, college students, high school students, and college and high school instructors. The college group included students who experienced a televised course as part of their studies and students who enrolled only in conventional classes. All high school students were in a televised course. The instructor group was drawn only from those actually participating in the study. Practically all the students who took part in the study in the spring wrote anonymous descriptions of instructional experiences. Instructors mailed their anonymously written descriptions of incidents to the research office.

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[1] The figure 1261 includes duplicate enrollments; practically all of the Science 10 group enrolled in Science 11.

[2] Description on page 12.

[3] Description on page 12.

[4] Description on page 11.

PART TWO

Problem Areas and Evaluation Methods

The Prospectus of the study guided the selection of problem areas. Clearly specified in the Prospectus were: (1) the repetition of four courses plus the expansion into natural science, (2) the increased attention to high school students, and (3) the appraisal of cost and administration of instructional television. Early in the study, opportunity was taken to follow up some students who had participated in the 1956-57 research and to add an exploration of attitudes toward the teaching-learning process. Thus, five broad areas of investigation were delineated.

Area I: College Students — Objective Appraisal. In the six college classes the investigation centered around the comparison of television and experimental groups under the following headings:

a. Achievement
b. Critical Thinking
c. Self-Insight
d. Attitude to Course Content
e. Attitude to Instructor
f. Attitude to Televison
g. Interest in Subject Matter
h. Relationships with Classmates

In addition, a questionnaire, administered both at the begining and at the end of the semester, gave evidence as to the extent to which certain student opinions changed during the course of the semester.

Area II: High School Students — Objective Appraisal. High school students in English 6.1 and Science 11 were compared with students in the Television on Campus groups under the following headings:

a. Achievement
b. Attitude to Course Content
c. Attitude to Instructor
d. Attitude to Television
e. Interest in Subject Matter

Area III: The Follow-Up Study. A follow-up questionnaire was administered to students taking English 6.2 in a regular campus class after having completed English 6.1 on television. (Both English 6.1 and English 6.2 are required courses in the general education program at San Francisco State College.)

Area IV: Attitudes to the Teaching-Learning Process — An Exploratory Study. All subjects in the study (Spring Semester) wrote descriptive statements of effective and ineffective classroom instructional experiences; subjects who were exposed to televised experiences wrote descriptions of effective and ineffective experiences for both media.

Area V: Administration, Production-Direction, and Cost Analysis. A separate organization was developed to coordinate the research project. Cost figures of major expenditures were kept during the study; other figures were taken from accounting records of the College. In the process of producing and directing the six televised courses, the production director noted and later described the problems he met and the solutions he found.

Area I: College Students — Objective Appraisal[1]

The problems studied in Area I follow. After the statement of each problem a brief description of the evaluation instrument and the evaluation procedure is included.

Achievement

Problem 1. Is there a significant relationship between achievement and medium of instruction (Television at Home, Television on Campus, Control)? Between achievement and supplementary discussion (Weekly discussion, Bi-Weekly Discussion, Weekly Activity, Home Assignment)?

These two question were investigated for three groups:

1. Total
2. High Ability (upper twenty-seven per cent on S.C.A.T.)
3. Low Ability (lower twenty-seven per cent on S.C.A.T.)

Achievement was evaluated in two ways:

1. A general content test given by the evaluation staff both at the beginning and at end of the semester.
2. An end-of-course examination constructed, given, and graded by the course instructors.

The general content tests given at the beginning and again at the end of the semester were all objective tests with one exception. In English 6.1, the increase in writing ability was measured through comparison of two written papers, one given during the first week and the other during the last week of the semester. The papers were graded on an objective scale previously developed by members of the Language Arts Division of San Francisco State College. In each course the difference between the posttest and pretest score was computed for each student; the mean gains for the various sub-groups were then compared via analysis of variance. Pretest scores were also analyzed to determine whether or not the groups were comparable at the beginning of the semester.

The reliabilities (split-half with Spearman-Brown correction for locally constructed tests) of the instruments used as pretests are as follows:

Course	r
Psychology 10.1	.85
Social Science 30	.92
Science 10	.80
Science 11	.79
Creative Arts 10	.96

The form of the final examination varied from course to course. Objective tests were administered in Science 10, Science 11, Psychology 10.1, and Creative Arts 10; an essay test was given in Social Science 30, and written assignments were required in English 6.1. As noted earlier, an analysis of covariance was employed to test for the presence or absence of differences among the groups with respect to achievement on the final examination.

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[1] The results of Area I are on page 16ff.

Critical Thinking

Problem 2. Is there a significant relationship between medium of instruction and critical thinking? Between supplementary discussion and critical thinking?

The evaluation instrument used to investigate this problem was the *Watson-Glaser Critical Thinking Appraisal.* This test is designed to provide problems and situations which require the application of the following important abilities involved in critical thinking:

1. Inference
2. Recognition of Assumptions
3. Deductions
4. Interpretation
5. Evaluation of Arguments

The test manual[1] suggests that the test may be useful in evaluating the relative efficiency of different methods of instruction which are intended to develop the ability to think critically. A reliability of .84 is reported for pre-sophomores.

The test was administered both as a pretest and as a posttest and the change in score was obtained for each student. The mean gains of the various sub-groups were compared by analysis of variance. Pretest scores were also analyzed to determine whether or not the groups were comparable at the beginning of the semester.

Self-Insight

Problem 3. Is there a significant relationship between medium of instruction and self-insight? Between supplementary discussion and self-insight?

The evaluation instrument for investigating this problem was the Individual Inventory, a partially standardized self-insight scale developed by Llewellyn Gross at the University of Buffalo. Gross defines self-insight as follows:

> Self-insight is the acceptance and admission of both the presence and absence of personality traits within one's self when this acceptance runs counter to a system of emotionally toned ideas or when the admission of the presence or absence of these traits clashes with one's own feelings of self-esteem.[2]

The student marked each of the thirty-seven Individual Inventory items on a 5-point scale in terms of agreement or disagreement with the item. Reliability is .85 (split-half with Spearman-Brown correction), with standard deviation 17.2.

The Individual Inventory was administered both as a pretest and as a posttest and the increase in score obtained for each student. The mean gains of the various sub-groups were compared by analysis of variance. Pretest scores were also analyzed to estimate whether or not the groups were comparable at the beginning of the semester.

Attitude to Course Content

Problem 4. Is there a significant relationship between medium of instruction and attitude to course content? Between supplementary discussion and attitude to course content?

The evaluation instrument, Attitude to Course Content[3] was a Thurstone-type scale developed about a 9-point continuum. Each item in a preliminary pool was rated on a scale of one to nine by a panel of student judges. From this preliminary pool, the forty items with the lowest index of ambiguity were selected for the final form. The weight assigned to a given item was simply the median rating of the judges on that item. In this study, a few items were modified and each score was multiplied by ten; thus, scores below fifty represent a favorable attitude and those above fifty an unfavorable attitude.

The scale was administered at the end of the semester and the mean scores of the various sub-groups compared by analysis of variance.

Attitude to Instructor

Problem 5. Is there a significant relationship between medium of instruction and attitude to instructor? Between supplementary discussion and attitude to instructor?

The instrument employed to investigate this problem was a Thurstone-type instructor rating scale containing twenty-three categories related to instructor effectiveness. On each item the student rated his principal instructor (television or lecture) along a 5-point scale (10, 30, 50, 70, 90).

Mean scores of the various sub-groups were compared by analysis of variance.

Attitude to Television

Problem 6. (a) Do students accept television as a medium of instruction? (b) Is the acceptance level the same for Television on Campus and Television at Home viewers? (c) If given the option, would students register for a second television course in preference to a regular campus class? (d) After students take Science 10, which medium will they choose for Science 11?

The evaluation instrument used to investigate Problem 6 (a) and 6 (b) was another Thurstone-type scale, constructed in exactly the same manner as the Attitude to Course Content Scale but containing twenty-seven questions. The data were analyzed by the t-ratio test.

Interest in Subject Matter

Problem 7. Is there a significant relationship between medium of instruction and level of interest? Between supplementary discussion and level of interest?

An interest scale developed at Pennsylvania State University was used to investigate this problem. The questionnaire had ten items, on each of which the student indicated, on a 5-point scale, the degree to which interest had been held. The five alternative responses on each item were assigned arbitrary numerical values of 10, 30, 50, 70, and 90. Low scores represent a high level of interest and high scores a low level. An item-correlation (Pearson r) of at least .70 is reported.

The mean scores of the various sub-groups were compared by analysis of variance.

Relationships with Classmates

Problem 8. Is there a significant relationship between medium of instruction and acquisition of friends and acquaintances? Between supplementary discussion and ecquisition of friends and acquaintances?

At the beginning and at the end of the semester the students in five of the six courses were asked to rate each of their fellow students on the following 7-point scale:

1. This person is one of my very best friends.
2. This person is a friend of mine.

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[1] Watson, G., and Glaser, E. M. *Manual for Watson-Glaser Critical Thinking Appraisal.* Yonkers-on-Hudson: World Book, 1952, P 2.

[2] Gross, L. *The Construction and Partial Standardization of a Scale for Measuring Self-Insight.* J. of Soc. Psychol., 1948, 28, Pp 219-236.

[3] This scale was one of several (Attitude to Course Content, Attitude to Instructor, Attitude to Television) constructed at Miami University, Oxford, Ohio. The scales in this battery have split-half reliabilities running from .89 to .92 (after correction for length of test).

3. I do not know this person very well, but I think if I knew him better he might become a friend of mine.
4. I don't know him well enough to judge whether or not I'd like him as a friend.
5. I don't enjoy being with him.
6. I would only talk or work with him when necessary.
7. I do not know this person at all.

After the data had been collected, the 7-point scale was reduced to a 4-point scale by combining the following categories: 1 and 2, 3 and 4, 5 and 6. A chi-square test was employed to analyze the results.

Change of Opinions Toward Television

Problem 9. Do students' opinions toward certain aspects of television change from the beginning to the end of the semester? Are the patterns of opinion essentially the same for television and control students?

A questionnaire, administered both at the beginning and at the end of the semester, asked for student opinions on learning, attention, student-instructor contact, preparation, and expected grade. Data were analyzed via chi-square.

Area II: High School Students — Objective Appraisal[1]

Two areas, achievement and attitudes, were studied in the high schools; these areas corresponded to portions of the college experiment. Thus, it was possible to make some rough comparisons between high school and selected college students. The four problems isolated for study follow.

Achievement

Problem 10. How does the achievement of high school groups compare with that of college Television on Campus groups with whom they are matched on the basis of S.C.A.T. scores?

Achievement was estimated by the same instruments that were used on campus for the same courses; performance standards were the same.

Problem 11. Do high ability high school students reach a satisfactory level of achievement when taking a college course by television?

"High ability" students corresponded to college freshmen whose scores were in the upper twenty-seven per cent on local S.C.A.T. norms. Achievement was studied by inspecting distributions of final grades.

Attitudes to Course Content, Instructor, Television, Interest in Subject Matter

Problem 12. What is the nature of the rating given by high school students to course content, to instructor, and to the television medium? Does a televised college course hold the interest of high school students?

The four attitude scales were administered to the high school students. The mean on each scale was compared with a neutral score of fifty, using the t-ratio test.[2]

Comparison of High School versus College Ratings on Attitudes

Problem 13. Are the high school students' ratings on course content, instructor, and television significantly different from those of college On Campus viewers? Do the two groups differ with respect to interest in subject matter?

On each of the four attitude scales the mean scores for the two groups (high school and college) were compared by the t-ratio test.[1]

Area III: The Follow-Up Study[4]

The problem selected for study compared student ratings of two highly similar courses, one taught in the spring by television and the other presented in the fall by conventional methods.

Problem 14. Do students give substantially the same rating to two required courses in the same subject, one taken by television, the other in a regular campus class?

A questionnaire was administered to students who took English 6.1 by television and who took English 6.2 in a regular campus class the subsequent semester.

Area IV: Attitudes to the Teaching-Learning Process An Exploratory Study[5]

Previous studies of televised instruction generally have indicated that there is a wide range of reactions by students and teachers to televised instruction. Unfortunately, other than getting some indications of relative preferences and some reasons for preferences, there have been few attempts to study whether there are perceived differences in the teaching-learning process as experienced via televised instruction and via conventional classroom instruction. In some studies this has been an implicit assumption (television *versus* conventional instruction). Television, somehow, has been assumed to be a qualitatively different form of the teaching-learning process. On the other hand, some have said that there are really no differences between televised and conventional instruction: A lecture is a lecture, face-to-face or face-to-screen.

Another assumption that has been made about televised instruction is that television is a novel form of instruction. Is it? If so, then elements of the teaching-learning process when experienced via television should be perceived to be different from these elements when exprienced via conventional instruction. If students and teachers perceive televised instruction as basically different from conventional teaching-learning experiences, would not this affect student achievement in some way? Yet, few significant differences have ever been found. Is it possible that the novelty of televised instruction has been overestimated?

Aim. The aim of this portion of the research was developed as a result of the questioning of the two aforementioned assumptions. The first is, televised instruction is qualitatively different from conventional classroom instruction; the second is, televised instruction is a novel form of the teaching-learning process. The general problem of this part of the study can be stated thus: Do students and teachers perceive differences in the teaching-learning process when it is experienced via television and via conventional classroom, irrespective of achievement?

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[1] The results of Area II are on page 30.

[2] $t = \frac{\bar{X}_1 - 50}{\frac{s}{\sqrt{N}}}$

[3] $t = \frac{\bar{X}_2 - \bar{X}_1}{s_p\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$

[4] The results of Area III are on page 33.

[5] The results of Area IV are on page 34.

Assumptions. Before specifying the problems that were studied, the stating of some assumptions will establish the frame of reference of the investigation. These were: Individuals who stated that an experience was effective meant the effect of the experience on them was positive, important, and worthwhile; few complex experiences are a total loss, and individuals can find something of value in most experiences; individual perceptions of experiences were clues to attitudinal sets and values regarding the teaching-learning process; attitudinal responses occurred only in terms of some frames of reference; students and teachers who were exposed to instructional television were already equipped with a great backlog of learning experiences, educational values, expectations, and attitudes. The critical variable for this portion of the study was the individual statements, whether written or oral, of what was effective or ineffective as a learning experience.

Methods and Procedure. An open-ended method was preferred because this portion of the study was conceived to be exploratory rather than conclusive. The Critical Incident Technique, developed by Flanagan, was selected because of its simplicity of direction, ease of task, and specificity and descriptiveness of content. The procedure followed was: (1) Written or oral descriptions about experiences in effective and ineffective televised instruction and in effective and ineffective conventional instruction were collected; (2) Categories were formulated and classification of incidents was made; and (3) The data were analyzed.

Collection of Data. The data were collected by oral interviews of faculty members who had some previous experience with instructional television and by written statements of faculty and students participating in the Project. The interviews were made by trained personnel. The purpose and requirements of the interviews were stated and specific questions were asked. A sample direction was: "As part of this investigation of televised instruction, we are interested in your reactions to the kind of teaching-learning experience you are having. Considering this, describe in some detail an incident having recently occurred in your course which made you *feel good* about televised instruction (i.e., made you feel that televised instruction was 'effective')." Directions for soliciting "ineffective" incidents followed the same pattern. Attempts were made to record verbatim responses.

The written descriptions were collected after the tenth telecast. A member of the research staff met each class on campus. Booklets were distributed that were assembled from four differently colored sheets with one question on each page (effective and ineffective television, effective and ineffective conventional classroom). The questions were identical with the oral interview questions. Anonymity was stressed rather dramatically to insure frankness; care was exercised to minimize talk between students. A period of approximately thirty minutes was required to answer the questions. Booklets were distributed to eighteen sections of students on campus (Science 11, English 6.1, and Creative Arts 10), to college and high school instructors, and to high school students. Instructors completed their booklets and anonymously mailed them to the research office.

Classification of Data. The major categories were defined by the problem: Effective Televised Instruction, Ineffective Televised Instruction, Effective Conventional Instruction, and Ineffective Conventional Instruction.

The seven lettered sub-categories were the same within each of the four major categories. They were defined thus:

A. **Teacher-Initiated Behavior**
Something the *teacher* said or did, or did not say or do. Primary emphasis was on some action or responsibility of the teacher.

B. **Student-Initiated Behavior**
Something the *student* did or could do or felt as a result of the situation. Primary emphasis was on the student's personal initiation and was differentiated from some primary interaction with the teacher or other students.

C. **Student-Teacher Interaction**
Some form of personal interaction between the student and the teacher on a one-to-one basis even though the interaction was in a class situation.

D. **Class Discussion or Interaction**
Some form of behavior or expression of attitude, feeling, or opinion which involved positive or negative interaction among students. Effect of students upon each other was included; teacher participation was not included

E. **Application of Course Material or Method**
Emphasis was on the non-person aspects of the teaching-learning process; there was emphasis on the results of what persons were doing; e.g., use of visual aids, films, outlines, or reading matter.

F. **Physical Aspects of the Teaching-Learning Process**
Emphases were on the room, the physical structure of the communication medium, and the perceptual situation. What the student could do with the medium was not included. What the instructor or producer did with the medium was included.

U. **Unusable**
Statements that were irrelevant to the assigned task or pages that were left blank were included in this category.

The seven sub-categories were identified by a content analysis of the oral and written statements of experiences. At the outset, the pages of the booklets were separated into four piles, one pile for each major category. From random samples drawn from each of the major categories, phrases were excerpted which were representative or critical aspects of teaching-learning behavior. The critical phrase was that portion of the description of behavior on which success or failure of the behavior was based. Examples of phrases follow. Effective television: Teacher clarified material (poem) in discussion on television. Ineffective television: Teacher shifted topic without preparing student. Effective classroom: Instructor was called away but class continued its discussion and study. Ineffective classroom: Unable to hear instructor in large classroom.[1] Each such critical phrase was labeled with a Roman numeral. The remainder of the statements were then read by three trained judges, who identified critical phrases, listed them, and gave them an appropriate Roman numeral. If a phrase was found that could not be labeled with an existing numeral, a new numeral was assigned. Judges met twice to combine numerical categories or eliminate them. Meanwhile, the evaluator had identified the seven sub-categories (based on the random samples). At this point, two naive judges classified the phrases according to the sub-categories. The average agreement between the naive judges and the original classification was sixty-five per cent. Finally, a new sorting was done independently by five trained judges; agreement reached ninety per cent when the criterion was agreement by three out of five judges.

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[1] See Appendix O for the complete list of these critical phrases.

Analysis of Data. It was necessary to assign weights to the critical phrases because judges were not in complete agreement, and yet comparisons among sub-categories were to be made. A weight of 1.0 was assigned to a critical phrase if there was complete agreement among the judges. A weight of .5 was assigned if there was less than complete agreement. Weights were assigned after at least two judges independently had read and classified the critical phrase. Although this procedure did introduce some error, the procedure appeared to be superior to a procedure that would have eliminated a number of incidents because agreement was not universal. It was believed that such a loss of data would have biased the results more than did the inclusion of data with some recognized error.

The remainder of the analysis was made largely by application of chi-square and rank order correlation.

Three major problems were seen; from these, specific questions were formulated.

Problem 15: Over-all Difference in Number of Critical Incidents. Is there a significant difference in the over-all number of critical incidents between televised and conventional classroom instruction when effective and ineffective processes are combined?

15a: Number of Incidents. Is there a significant difference in the number of critical incidents (each critical incident describes one kind of process) between *effective televised* instruction and *effective classroom* instruction?[1] Between *ineffective televised* instruction and *ineffective classroom* instruction?

1. In each sub-category (A, B, C, D, E, and F), are there significant differences in the number of critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?
2. In each group (Experimental, Teachers, and High School) in each sub-category (A through F), are there significant differences in the number of critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?

15b: Kinds of Incidents. Over-all, is there more similarity than dissimilarity among critical incidents when (1) *effective televised* instruction is compared with *effective classroom* instruction, and (2) *ineffective televised* instruction is compared with *ineffective classroom* instructon?

1. In each sub-category (A through F), are there significant differences in the *kinds* of critical incidents when *effective televised* instruction is compared with *effective classroom* instruction?
2. Are there significant differences between media and in each sub-category in the number of *dissimilar* incidents describing *effective* instruction?

15c: Similar and Dissimilar Ineffective Incidents. Is there more similarity than dissimilarity in the critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?

1. In each sub-category (A through F), are there significant differences in the *kinds* of critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?
2. Are there significant differences between over-all media, and in sub-categories, in the number of dissimilar incidents describing *ineffective* instruction?
3. Are there differences between over-all media and in each sub-category *within groups* in the number of *dissimilar* incidents describing *ineffective* instruction?

15d: Similar and Dissimilar Effective Incidents. In each *group* (Experimental, Teachers, and High School) in each subcategory (A through F), are there significant differences in the *kinds* of critical incidents when (1) *effective televised* instruction is compared with *effective classroom* instruction; when (2) *ineffective televised* instruction is compared with *ineffective classroom* instruction?

Problem 16. Are there differences *within groups* in *emphases* (rankings) of critical incidents (in sub-categories) identified as *effective* and *ineffective* with respect to both *televised* and *classroom* instruction?

a. Within each Medium. Are there differences, within groups, in emphases (rankings) on sub-categories (A through F) identified as *effective* and *ineffective* with respect to *televised instruction?* With respect to *conventional* instruction?
b. Between Media. Are there differences, within groups, in emphases (rankings) on sub-categories (A through F) identified as *effective* with respect to *televised* versus *classroom* instruction? As *ineffective* with respect to *televised* versus *classroom* instruction?

Problem 17. Are there differences, *between groups*, in emphases (rankings) of critical incident on sub-categories (A through F) identified as *effective* and *ineffective* with respect to both *televised* and *conventional* instruction?

Area V: Administrative, Production-Direction, and Cost Studies[2]

Unique administrative problems arose because the research project, in its second year, was still a novelty on campus. The Project affected, directly or indirectly, personnel in all major instructional and administrative areas of the College. Further, the courses were offered for credit to the public through the Extension services of the College. Finally, all the local academic high schools enrolled students in one or more of the college courses.

The telecasting of the college courses required close cooperation between KQED, the San Francisco Bay Area Educational Television Station, and college production and direction personnel. The College's Producer-Director recorded his observations of this aspect of the study. His comments cover three major topics: Staff and Equipment, Instruction, and Production-Direction.

Cost figures were taken from two sources: actual expenditures made by the Project and College accounting records kept in the office of the Business Manager. The nature of some costs, for example, station charges were readily determined; other costs, such as room depreciation, were, at best, approximations.

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[1] The difference in numbers of critical incidents between effective televised and effective classroom instruction was not statistically significant (sixty-six critical incidents for effective classroom and seventy-one critical incidents for effective television); therefore, the problem could not be analyzed further.

[2] Results of Area V are on page 42.

PART THREE

Results

The results of the statistical analyses[1] of Area I: College Students-Objective Appraisal; Area II: High School Student-Objective Appraisal; Area III: The Follow-Up Study; and Area IV: Attitudes to the Teaching-Learning Process are reported in this part of the study. Area V: Administration, Production-Direction, and Cost Analysis is reported in Part IV. The presentation of the areas and problems are numbered to correspond to the same problems in Part II. Moreover, there is given for each area the page in Part II which describes the rationale, procedure and evaluation instrument(s) for the problems.

In the analyses which follow, four quantities are listed for each instrument in each course:

1. The means or mean gains;
2. The standard deviations (s.d);
3. The value of F, t, or chi-square;
4. The statistical significance of the differences, that is the probability of obtaining by chance the reported F, t, or chi-square value. These are entered as yes or no; if the entry is yes, the probability value is indicated. All differences which reach the 5% level of significance are accepted as representing true differences.

Before giving specific results, an additional point should be noted. In a few cases, none of the groups made significant gains in the ability under consideration; at the same time, fairly large standard deviations were reported. Two possible explanations are: the abilities tested were not developed by either medium of instruction; these abilities were developed but the error of measurement may have been larger than the actual gain.

Area I: College Students — Objective Appraisal[2]

Problem 1

a. Is there a significant relationship between achievement and medium of instruction (Television at Home, Television on Campus, Control)? Between achievement and supplementary discussion (Weekly Discussion, Bi-Weekly Discussion, Weekly Activity, Home Assignments)?

b. Is there a significant relationship between achievement and medium of instruction for high and low academic ability groups? Between achievement and supplementary discussion?

The two measures of achievement were: (1) the general content test given at the beginning and at the end of the semester, and (2) the final examination.

High and low academic ability were defined thus: (1) high academic is the upper twenty-seven per cent, as measured by S.C.A.T.; (2) low academic is the lower twenty-seven per cent on the same test.

Results: Problem 1a (Pretest-Posttest). The mean gains reported in Tables 1 through 3 represent the difference between pretest and posttest results on the general content tests.[3]

Table 1

Relationship of Achievement Gain (Pretest-Posttest) to Medium of Instruction and to Supplementary Discussion in Science 10

Science 10	N	Mean Gain	s.d.	F	Statistically Significant
Medium				0.81	No
TV at Home	80	22.0	9.8		
TV on Campus	80	22.7	11.2		
Control	80	24.3	13.8		
Supplementary Discussion				0.28	No
Weekly	60	22.6	14.5		
Bi-Weekly	60	24.0	12.3		
Weekly Activity	60	23.3	9.5		
Home Assignment	60	22.1	13.8		
Interaction (Medium-Supplementary Discussion)				0.66	No

Table 2

Relationship of Achievement Gain (Pretest-Posttest) to Medium of Instruction and to Supplementary Discussion in Science 11

Science 11	N	Mean Gain	s.d.	F	Statistically Significant
Medium				2.89	No
TV at Home	80	22.4	8.4		
TV on Campus	80	23.2	10.6		
Control	80	19.9	8.8		
Supplementary Discussion				0.32	No
Weekly	60	22.4	9.4		
By-Weekly	60	21.6	10.8		
Weekly Activity	60	21.0	9.0		
Home Assignment	60	22.3	8.4		
Interaction (Med. Sup. Discussion)				2.82	No

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[1] The analyses in this experiment (except chi-square) are valid only when the assumptions of homogeneity of variance and normality of distribution are satisfied. The homegeneity of variance assumption was tested for all instruments in all courses, using the appropriate procedure (Bartlett's test, or the formula $F = s_1^2/s_2^2$). In a few instances, Bartlett's test gave evidence that the variances were not homogeneous. Fortunately, this did not present a problem; in nearly every such case, the main test for the difference in the means yielded a non-significant F-ratio. The results of the homogeneity tests are given in Appendix D. The normality assumption was checked for those cases in which significant differences were found in the means.

[2] For a description of methods and materials see page 11.

[3] An analysis of variance of pretest results indicated that all groups, except English 6.1 (see Appendix B), were comparable at the beginning of the semester. The details of the analysis of gains on general content tests appear in Appendix E.

Table 3

Relationship between Achievement Gain and Medium of Instruction in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean Gain	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				2.00	No
TV at Home 1	24	14.6	9.5		
TV at Home 2	24	11.3	6.4		
TV on Campus	24	15.5	6.3		
Control	24	11.2	6.0		
English 6.1					
Medium				7.55	Yes (.01)**
TV at Home	24	26.7	30.6		
TV on Campus	24	32.3	32.7		
Control	24	–2.7	34.2		
Social Science 30					
Medium				0.97	No
TV at Home 1..	18	8.0	8.5		
TV at Home 2..	18	13.3	11.0		
Control	18	10.2	14.5		
Creative Arts 10					
Medium				5.34	Yes (.05)*
TV at Home	65	11.4	7.9		
Control	65	14.8	8.8		

* Significant beyond the 5% level.
** Significant beyond the 1% level.

With respect to achievement gains in general content for the six courses, there was no evidence that any one medium of instruction was superior to the others. This finding was based on the fact that the F-ratios were non-significant in all courses except English 6.1 and Creative Arts 10 and, in these courses, the results were not in agreement. The Television group was superior in English 6.1 (1% level of significance),[1] and the Control group in Creative Arts 10 (5% level of significance).[2]

Results: Problem 1a (Final Exams). The results on the final examinations appear in Tables 4 through 7.[3]

Table 4

Results on Final Examination by Medium of Instruction and Supplementary Discussion in Science 10

Science 10	N	Adjusted Mean	s.d.	F	Statistically Significant
Medium				12.79	Yes (.01)*
TV at Home	80	100.3	10.8		
TV on Campus	80	90.9	14.8		
Control	80	94.0	12.1		
Supplementary Discussion				2.23	No
Weekly	60	97.3	10.8		
Bi-Weekly	60	96.2	15.5		
Weekly Activity ..	60	95.8	12.1		
Home Assignment	60	91.0	13.0		
Interaction (Med.-Sup. Discussion)				1.10	No

* Significant beyond the 1% level.

Since a significant F-value was found for medium, that is, a true difference among the three methods of instruction, Television at Home, Television on Campus, and Control, a further analysis was necessary to identify which medium was primarily responsible for the observed difference. This was done by comparing the mean score of one method of instruction with the mean score of the other methods. The t-ratios appear in Table 5. The analysis shows that Television at Home was primarily responsible for the difference

Table 5

t Ratios of Comparisons Among Media in Science 10

Comparison	t	Statistically Significant
TV at Home vs. TV on Campus....	4.58	Yes (.01)*
TV at Home vs. Control................	3.50	Yes (.01)*
TV on Campus vs. Control............	1.45	No

*Significant beyond the 1% level.

Table 6

Results on Final Examination by Medium of Instruction and Supplementary Discussion in Science 11

Science 11	N	Mean	s.d.	F	Statistically Significant
Medium				1.25	No
TV at Home	80	90.4	15.8		
TV on Campus	80	92.6	18.4		
Control	80	89.7	13.9		
Supplementary Discussion				0.13	No
Weekly	60	92.2	15.6		
Bi-Weekly	60	92.5	16.7		
Weekly Activity ..	60	90.0	16.1		
Home Assignment	60	88.8	16.1		
Interaction Med.-Sup. Discussion)				1.91	No

Table 7

Results on Final Examination by Medium of Instruction in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				2.54	No
TV at Home 1..	24	252.7	36.7		
TV at Home 2..	24	243.9	41.4		
TV on Campus	24	261.9	39.2		
Control	24	235.3	42.5		
English 6.1					
Medium				16.71	Yes (.01)**
TV at Home....	24	336.9	25.5		
TV on Campus	24	296.8	64.4		
Control	24	300.4	58.2		
Social Science 30					
Medium				2.78	No
TV at Home 1..	18	73.9	10.0		
TV at Home 2..	18	74.9	10.3		
Control	18	71.4	8.7		
Creative Arts 10					
Medium				4.07	Yes (.05)*
TV at Home	65	92.9	8.4		
Control	65	95.4	8.4		

*Significant beyond the 5% level.
**Significant beyond the 1% level.

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[1] The F-ratio was of a magnitude which would occur by chance less than once in one hundred times.

[2] The F-ratio was of a magnitude which would occur by chance less than five in one hundred times.

[3] For details of the analysis of covariance see Appendix F.

The performance level of Television at Home students on final examinations with one exception was at least as good as that of the corresponding Control groups. There was, in fact, some evidence favoring television:

1. In two courses (Science 10 and English 6-1), Television at Home reached a significantly higher level of achievement than did the other two groups. F-ratios were significant beyond the 1% level[1]; in Science 10, t-ratios were significant and favored the Television at Home group.
2. In three other courses, Science 11, Psychology 10.1, Social Science 30, the same pattern prevailed; however, the differences were not large enough to be statistically significant.
3. The results in Creative Arts 10 were not in agreement with the above pattern; here, the Control group reached a significantly higher level of achievement (significant beyond the 5% level).

Results: Problem 1b (High Ability). Results on high academic ability groups appear in Tables 8 through 11.[2]

Table 8

Performances of High Academic Ability Groups on Achievement Test by Medium of Instruction and Supplementary Discussion in Science 10

Science 10	N	Adjusted Mean	s.d.	F	Statistically Significant
Medium				9.77	Yes (.01)*
TV at Home	24	106.5	9.6		
TV on Campus	24	93.2	13.4		
Control	24	98.5	9.6		
Supplementary Discussion				2.19	No
Weekly	18	101.4	12.5		
Bi-Weekly	18	101.3	14.6		
Weekly Activity	18	101.7	9.9		
Home Assignment	18	104.2	9.9		
Interaction (Med.-Sup. Discussion)				0.51	No

* Significant beyond the 1% level.

Table 9

t Ratios of Comparisons Among Media of High Academic Ability Groups in Science 10

Comparison	t	Statistically Significant
TV at Home vs. TV on Campus	4.04	Yes (.01)*
TV at Home vs. Control	1.85	No
TV on Campus vs. Control	1.58	No

* Significant beyond the 1% level.

Table 10

Performances of High Academic Ability Groups on Achievement Test by Medium of Instruction and Supplementary Discussion in Science 11

Science 11	N	Mean	s.d.	F	Statistically Significant
Medium				0.15	No
TV at Home	24	101.0	17.6		
TV on Campus	24	101.7	19.1		
Control	24	96.0	14.5		
Supplementary Discussion				0.16	No
Weekly	18	100.4	14.2		
Bi-Weekly	18	100.7	16.6		
Weekly Activity	18	99.2	20.1		
Home Assignment	18	98.0	18.2		
Interaction (Med.-Sup. Discussion)				1.67	No

Table 11

Performances of High Academic Ability Groups on Achievement Test by Medium of Instruction in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				0.07	No
TV at Home 1	7	275.4	39.4		
TV at Home 2	7	272.3	33.1		
TV on Campus	7	287.1	48.4		
Control	7	276.3	37.0		
English 6.1					
Medium				1.22	No
TV at Home	6	337.0	36.1		
TV on Campus	6	327.0	46.3		
Control	6	319.7	90.8		
Social Science 30					
Medium				3.73	No
TV at Home 1	5	83.4	13.4		
TV at Home 2	5	83.8	4.3		
Control	5	73.6	10.9		
Creative Arts 10					
Medium				0.75	No
TV at Home	18	97.2	7.5		
Control	18	100.2	6.5		

With respect to achievement of high ability students on final examinations, it could not be concluded that any one medium of instruction was generally superior to the others. (In Science 10, there was a significant difference, and it favored Television at Home.) Further, in Science 10 and Science 11, there was no evidence that small group discussion had a significant effect on achievement. However, in view of the small N's in three courses, Psychology 10.1, English 6.1, and Social Science 30, results should be viewed with caution.

Results: Problem 1b (Low Ability). The results for low ability students appear in Tables 12 through 15.[3]

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[1] In English 6.1, the results must be viewed with caution since the assumption of homogeneity of variance was not satisfied; however, the observed F-ratio was well beyond the 1% level and cannot be casually dismissed.

[2] For details on analysis of covariance see Appendix G.

[3] For details on analysis of covariance see Appendix H.

Table 12

Performances of Low Academic Ability Groups on Achievement Test by Medium of Instruction and Supplementary Discussion in Science 10

Science 10	N	Adjusted Mean	s.d.	F	Statistically Significant
Medium				4.09	Yes (.05)*
TV at Home	24	95.4	8.7		
TV on Campus	24	84.6	16.5		
Control	24	89.0	14.3		
Supplementary Discussion				1.63	No
Weekly	18	96.0	9.0		
Bi-Weekly	18	87.8	16.3		
Weekly Activity	18	90.0	11.3		
Home Assignment	18	84.7	17.0		
Interaction (Medium-Supplementary Discussion)				0.42	No

* Significant beyond the 5% level.

Table 13

t Ratios of Comparisons Among Media of Low Academic Ability Groups in Science 10

Comparison	t	Statistically Significant
TV at Home vs. TV on Campus	4.00	Yes (.01)**
TV at Home vs. Control	2.65	Yes (.02)*
TV on Campus vs. Control	1.40	No

* Significant beyond the 2% level.
** Significant beyond the 1% level.

Table 14

Performances of Low Academic Ability Groups on Achievement Test by Medium of Instruction and Supplementary Discussion in Science 10

Course	N	Mean	s.d.	F	Statistically Significant
Medium				1.46	No
TV at Home	24	80.5	10.6		
TV on Campus	24	84.0	13.8		
Control	24	80.8	11.2		
Supplementary Discussion				0.75	No
Weekly	18	83.1	11.3		
Bi-Weekly	18	83.7	12.2		
Weekly Activity	18	80.8	14.4		
Home Assignment	18	79.5	9.8		
Interaction (Medium-Supplementary Discussion)				1.65	No

Table 15

Performance of Low Academic Ability Groups on Achievement Test by Medium of Instruction in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				2.55	No
TV at Home 1	7	236.4	35.8		
TV at Home 2	7	202.6	38.8		
TV on Campus	7	233.0	29.4		
Control	7	201.4	20.4		
English 6.1					
Medium				1.70	No
TV at Home	6	330.7	17.9		
TV on Campus	6	274.0	84.3		
Control	6	293.7	42.9		
Social Science 30					
Medium				1.90	No
TV at Home 1	5	67.0	10.5		
TV at Home 2	5	72.4	7.2		
Control	5	63.4	7.0		
Creative Arts 10					
Medium				0.03	No
TV at Home	18	91.6	8.4		
Control	18	92.6	8.4		

With respect to achievement of low ability students on final examinations, it could not be concluded that any one medium of instruction was generally superior to the others. Again, as for high ability, there was one comparison, Science 10, which significantly favored Television at Home. Further, in Science 10 and Science 11, there was no evidence that small group discussion had a significant effect on achievement.

Problem 2

Is there a significant relationship between medium of instruction and critical thinking? Between supplementary discussion and critical thinking?

Results: Problem 2. The mean gains reported in Tables 16 through 18 represent the difference between pretest and posttest results on Watson-Glaser Critical Thinking Appraisal.[1]

Table 16

Relationship of Critical Thinking Gains (Pretest-Posttest) to Medium of Instruction and to Supplementary Discussion in Science 11

Science 10	N	Mean Gain	s.d.	F	Statistically Significant
Medium				0.64	No
TV at Home	80	2.8	7.7		
TV on Campus	80	4.0	6.7		
Control	80	3.4	5.9		
Supplementary Discussion				1.07	No
Weekly	60	4.2	6.7		
Bi-Weekly	60	2.6	7.4		
Weekly Activity	60	2.7	6.4		
Home Assignment	60	4.2	6.6		
Interaction (Medium-Supplementary Discussion)				1.24	No

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[1] An analysis of variance of pretest scores indicated that all groups were comparable at the beginning of the semester. The details of this analysis are presented in Appendix I.

Table 17

Relationship of Critical Thinking Gains (Pretest-Posttest) to Medium of Instruction and to Supplementary Discussion in Science 11

Science 11	N	Mean Gain	s.d.	F	Statistically Significant
Medium				0.61	No
TV at Home	80	1.6	7.1		
TV on Campus	80	0.9	7.2		
Control	80	2.1	7.2		
Supplementary Discussion				1.33	No
Weekly	60	2.3	7.0		
Bi-Weekly	60	2.5	6.2		
Weekly Activity	60	0.4	8.3		
Home Assignment	60	0.8	8.9		
Interaction (Medium-Supplementary Discussion)				1.50	No

Table 18

Relationship between Critical Thinking Gains and Medium of Instruction in Psychology 10.1, English 6.1, and Social Science 30

Course	N	Mean Gain	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				1.16	No
TV at Home 1	24	0.5	5.3		
TV at Home 2	24	3.1	8.4		
TV on Campus	24	3.7	5.5		
Control	24	2.3	5.7		
English 6.1					
Medium				0.46	No
TV at Home	24	0.7	7.5		
TV on Campus	24	0.0	9.2		
Control	24	-2.0	6.4		
Social Science 30					
Medium				0.87	No
TV at Home 1	17	2.5	8.4		
TV at Home 2	17	5.3	7.9		
Control	17	2.2	6.2		

All the F-ratios were non-significant. Thus, there was no evidence that any one of the three media of instruction was any better than the others in teaching critical thinking; neither was there any evidence that small group discussion in Science 10 and Science 11 had a significant effect on the student's ability to do critical thinking.

Problem 3

Is there a significant relationship between medium of instruction and self-insight? Between supplementary discussion and self-insight?

Results: Problem 3. The mean gains reported in Tables 19 through 21 represent the difference between pretest and posttests results on the Individual Inventory.[1]

Table 19

Relationship of Self-Insight (Prestest-Posttest) to Medium of Instruction and Supplementary Discussion in Science 10

Science 10	N	Mean Gain	s.d.	F	Statistically Significant
Medium				1.78	No
TV at Home	80	4.1	14.3		
TV on Campus	80	3.3	18.6		
Control	80	7.6	12.5		
Supplementary Discussion				0.16	No
Weekly	60	5.8	13.1		
Bi-Weekly	60	5.4	18.9		
Weekly Activity	60	4.7	17.1		
Home Assignment	60	4.0	11.9		
Interaction (Medium-Supplementary Discussion)				1.11	No

Table 20

Relationship of Self-Insight Gains (Pretest-Posttest) to Medium of Instruction and Supplementary Discussion in Science 11

Science 11	N	Mean Gain	s.d.	F	Statistically Significant
Medium				0.77	No
TV at Home	80	0.7	14.2		
TV on Campus	80	-1.4	14.8		
Control	80	1.3	13.6		
Supplementary Discussion				1.31	No
Weekly	60	-2.6	12.9		
Bi-Weekly	60	2.2	12.7		
Weekly Activity	60	-0.3	19.5		
Home Assignment	60	1.4	8.7		
Interaction (Medium-Supplementary Discussion)				0.45	No

Table 21

Relationship between Self-Insight Gains and Medium of Instruction in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean Gain	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				1.42	No
TV at Home 1	24	8.5	12.0		
TV at Home 2	24	3.5	9.6		
TV on Campus	24	8.4	12.1		
Control	24	9.8	12.2		
English 6.1					
Medium				1.89	No
TV at Home	24	-1.0	13.7		
TV on Campus	24	-0.8	10.3		
Control	24	5.2	14.5		
Social Science 30					
Medium				0.17	No
TV at Home 1	18	0.0	8.6		
TV at Home 2	18	-2.9	6.3		
Control	18	0.6	9.0		
Creative Arts 10					
Medium				0.03	No
TV at Home	65	-0.6	11.9		
Control	65	-0.9	11.0		

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[1] An analysis of variance of pretest scores indicated that all groups were comparable at the beginning of the semester. The details of this analysis are presented in Appendix J.

All the F-ratios were non-significant. Thus, there was no evidence that any one of the three media of instruction was any better than the others in developing self-insight; neither was there any evidence that small group discussion or activity in Science 10 and Science 11 was superior to home assignments in developing self-insight.

Problem 4

a. Is there a significant relationship between medium of instruction and attitude to course content? Between supplementary discussion and attitude to course content?

b. Is there a significant relationship between medium of instruction and over-all evaluation of course content?

Results Problem 4a. The results on the Attitude to Course Content[1] scale are summarized in Tables 22 through 25.

Table 22

Results on Attitude to Course Content Scale in Science 10

Science 10	N	Mean	s.d.	F	Statistically Significant
Medium				13.63	Yes (.01)*
TV at Home	88	35.9	10.2		
TV on Campus	88	41.2	11.3		
Control	88	33.8	7.8		
Supplementary Discussion				0.54	No
Weekly	66	35.7	10.5		
Bi-Weekly	66	32.5	10.2		
Weekly Activity	66	35.4	11.2		
Home Assignment	66	33.7	9.5		
Interaction (Medium-Supplementary Discussion)				2.01	No

* Significant beyond the 1% level.

Since the F-value for medium was significant, t-ratios were computed with results as follows:

Table 23

t Ratios of Comparisons Among Media Groups on Attitude to Course Content Scale in Science 10

Comparison	t	Statistically Significant
TV at Home vs. TV on Campus	2.56	Yes (.02)*
TV at Home vs. Control	0.83	No
TV on Campus vs. Control	4.38	Yes (.01)**

* Significant beyond the 2% level.
** Significant beyond the 1% level.

Table 24

Results on Attitude to Course Content Scale in Science 11

Science 11	N	Mean	s.d.	F	Statistically Significant
Medium				0.96	No
TV at Home	84	37.2	11.4		
TV on Campus	84	39.6	12.4		
Control	84	37.8	11.5		
Supplementary Discussion				0.56	No
Weekly	63	38.4	12.0		
Bi-Weekly	63	37.8	11.3		
Weekly Activity	63	37.0	10.6		
Home Assignment	63	39.6	12.4		
Interaction (Medium-Supplementary Discussion)				1.00	No

Table 25

Results on Attitude to Course Content Scale in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				2.16	No
TV at Home 1	26	37.7	9.3		
TV at Home 2	26	35.3	9.9		
TV on Campus	26	40.3	11.8		
Control	26	33.6	8.8		
English 6.1					
Medium				2.55	No
TV at Home	26	39.5	11.7		
TV on Campus	26	47.0	14.9		
Control	26	39.7	14.3		
Social Science 30					
Medium				1.07	No
TV at Home 1	19	38.8	11.6		
TV at Home 2	19	40.2	12.1		
Control	19	34.5	10.3		
Creative Arts 10					
Medium				0.74	No
TV at Home	110	57.3	13.6		
Control	110	55.9	11.4		

There was evidence that the Television on Campus viewers had a *less* favorable attitude to course content than had the other two groups. This conclusion was based on the following facts:

1. In Science 10, the F-ratio for medium of instruction would occur by chance less than once in one hundred times. A further analysis by t-ratio indicated that it was the less favorable attitude of the Television on Campus group which accounted for the significant F-ratio.
2. In the other three courses which had Television on Campus, the same pattern prevailed. The F-ratios, however, did not reach the five per cent level of significance.

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[1] See Appendix K for the analysis of variance.

Between Television at Home and Control groups, the differences in means for all six courses were small and statistically non-significant. Further, there was no evidence that small group discussion had a significant effect on the student's attitude to course content.

Results: Problem 4b. As part of the attitude scale, the students in all six courses were asked for an over-all evaluation of course content. A summary of this evaluation is given in Table 26.

Table 26

Over-all Evaluation by Students on Attitude to Course Content Scale in Six Courses. Values Are in Per Cent

Rating of Course	Science 10			Science 11			Social Science 30	
	TV at Home	TV on Campus	Control	TV at Home	TV on Campus	Control	TV at Home	Control
Superior	55	38	75	61	55	63	45	63
Average	29	44	22	28	30	28	35	26
Inferior	16	18	3	10	15	9	20	11
	Psychology 10.1			English 6.1			Creative Arts 10	
Superior	46	39	68	39	19	65	5	9
Average	34	42	30	36	40	19	20	18
Inferior	20	19	2	25	38	16	74	73

Thus, in over-all evaluation, a high rating (forty per cent or higher) was given to course content in five out of six Control, and in four out of six experimental groups. In all six courses this rating was higher in the Control than in the experimental groups. Between Television at Home and Television on Campus, the home viewers gave a more favorable rating in all four courses.

Problem 5

a. Is there a significant relationship between medium of instruction and attitude to instructor? Between supplementary discussion and attitude to instructor?

b. Is there a significant relationship between medium of instruction and over-all evaluation of instructor effectiveness?

Results: Problem 5a. The results on the Attitude to Instructor scale[1] are summarized in Tables 27 through 31.

Table 27

Results on Attitude to Instructor Scale in Science 10

Science 10	N	Mean	s.d.	F	Statistically Significant
Medium				3.73	No
TV at Home	88	34.7	13.3		
TV on Campus	88	40.2	13.2		
Control	88	28.1	9.9		
Supplementary Discussion				0.17	No
Weekly	66	35.7	13.6		
Bi-Weekly	66	32.5	12.8		
Weekly Activity	66	35.4	13.9		
Home Assignment	66	33.7	12.3		
Interaction (Medium-Supplementary Discussion)				6.50	Yes (.01)*

* Significant beyond the 1% level.

Table 28

Results on Attitude to Instructor Scale in Science 11

Science 11	N	Mean	s.d.	F	Statistically Significant
Medium				4.15	Yes (.05)*
TV at Home	84	30.4	12.8		
TV on Campus	84	34.8	11.8		
Control	84	30.0	11.5		
Supplementary Discussion				0.18	No
Weekly	63	31.2	12.0		
Bi-Weekly	63	32.0	12.2		
Weekly Activity	63	32.5	12.5		
Home Assignment	63	31.1	12.3		
Interaction (Medium-Supplementary Discussion)				2.03	No

* Significant beyond the 5% level.

Table 29

Results on Attitude to Instructor Scale in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				3.22	Yes (.05)*
TV at Home 1	26	33.9	10.0		
TV at Home 2	26	32.0	13.7		
TV on Campus	26	39.6	12.7		
Control	26	30.3	12.5		
English 6.1					
Medium				7.50	Yes (.01)**
TV at Home	26	31.8	9.2		
TV on Campus	26	41.2	13.0		
Control	26	29.5	12.0		
Social Science 30					
Medium				0.14	No
TV at Home 1	21	34.5	12.0		
TV at Home 2	21	34.7	12.8		
Control	21	32.9	11.1		
Creative Arts 10					
Medium				15.57	Yes (.01)**
TV at Home	110	50.0	14.5		
Control	110	57.5	13.7		

* Significant beyond the 5% level.
** Significant beyond the 1% level.

Table 30

t Ratios of Comparisons Among Media Groups on Attitude to Instructor Scale in Psychology 10.1

Comparison	t	Statistically Significant
TV at Home vs. TV on Campus	2.25	Yes (.05)*
TV at Home vs. Control	0.93	No
TV on Campus vs. Control	3.72	Yes (.01)**

* Significant beyond the 5% level.
** Significant beyond the 1% level.

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[1] See Appendix L for the analysis of variance.

There was evidence that the Television on Campus viewers had a **less** favorable attitude to their principal instructor (television lecturer) than did the other two groups. This conclusion is based on the following:

1. In three out of four courses the F-ratio was significant beyond the five per cent level; that is, the F-ratio was of a magnitude which would occur by chance less than five in one hundred times. In these three cases, it was the less favorable attitude of the Television on Campus viewers which produced the significant F-ratio.
2. In the fourth course, Science 10, the same pattern prevailed, but the F-ratio did not reach the five per cent level of significance.

In Science 10, for medium, there was a marked difference in the magnitude of means; however, the differences were found to be non-significant because of interaction effects. (See Appendix L.) The interaction effect, in part, may have resulted from the cumulative impact of one instructor's dual function: that of television instructor and discussion leader of one Television at Home group.

Between Television at Home and Control groups, the differences in the means were small and non-significant in five out of six courses. In the sixth course, Creative Arts 10, the Control group had a significantly less favorable attitude than had the Television at Home group. (The F-ratio was of a magnitude which would occur by chance less than once in one thousand times.)

Results: Problem 5b. As a part of the attitude scale, the students in all six courses were asked for an over-all evaluation of instructor effectiveness. A summary of this evaluation is given in Table 31. The table shows the per cent of students in each group who rated each instructor as Superior, Average, or Inferior.

Table 31

Over-all Evaluation by Students on Attitude to Course Content Scale in Six Courses. Values Are in Per Cent

Rating of Instructor	Science 10 TV at Home	Science 10 TV on Campus	Science 10 Control	Science 11 TV at Home	Science 11 TV on Campus	Science 11 Control	Social Science 30 TV at Home	Social Science 30 Control
Superior	61	49	86	84	79	83	76	67
Average	35	38	14	16	21	14	13	24
Inferior	4	13	0	0	0	3	11	9
	Psychology 10.1			English 6.1			Creative Arts 10	
Superior	72	61	78	83	52	73	18	7
Average	26	35	22	15	33	27	59	47
Inferior	2	4	0	2	15	0	23	46

Although there was variation among the sixteen groups in the six courses in over-all evaluation of instructor effectiveness, the students in fourteen of the sixteen groups and in five of the six courses gave very high ratings to their instructors. Students in Control and Television at Home groups gave the highest ratings. The Television at Home group in Creative Arts 10, the course in which the instructor did not receive high ratings, rated instructor effectiveness higher than did the Control group.

Problem 6

a. Do students accept television as a medium of instruction?
b. Is the acceptance level the same for On Campus and At Home Television viewers?
c. If given an hypothetical option, would students register for a second television course in preference to a regular campus class?
d. What is the behavioral choice of students in Science 10 who decide to take Sciece 11?

Results: Problem 6a. The results on the Attitude to Television scale (medium of instruction) are summarized in Table 32.

Table 32

Summary of Results on Student Attitude to Acceptance of Television as Medium of Instruction in Six Courses

Course	N	Mean†	s.d.	t[1]	Statistically Significant	Student Attitude
Science 10 .... TV at Home	88	47.9	10.9	−1.81	No	Neutral
Science 10 .... TV on Campus	88	50.5	10.4	0.46	No	Neutral
Science 11 .... TV at Home	86	46.9	9.6	−3.00	Yes (.01)*	Favorable to TV
Science 11 .... TV on Campus	102	52.4	9.5	2.68	Yes (.01)*	Unfavorable to TV
Psychology 10.1 .... TV at Home	55	45.3	9.7	−3.60	Yes (.01)*	Favorable to TV
Psychology 10.1 .... TV on Campus	30	50.3	9.1	0.18	No	Neutral
English 6.1 .... TV at Home	39	51.4	9.5	0.85	No	Neutral
English 6.1 .... TV on Campus	26	56.5	8.4	4.28	Yes (.01)*	Unfavorable to TV
Social Science 30 .... TV at Home	55	47.5	11.3	−1.63	No	Neutral
Creative Arts 10	132	60.9	7.8	14.7	Yes (.001)**	Unfavorable to TV

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* Significant beyond the 1% level.
** Significant beyond the .1% level.

[1] $t = \frac{\bar{X}_1 - 50}{\frac{s}{\sqrt{N}}}$ $t = \frac{\bar{X}_2 - \bar{X}_1}{s_p\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$

†A score of 50 was taken to represent a neutral attitude. Scores significantly below 50 were called "favorable"; those significantly above 50 were rated "unfavorable."

The results in Table 32 indicate that attitude to television was favorable in two groups, neutral in five, and unfavorable in three. Thus, in seven out of ten groups, television was "accepted" as a medium of instruction. Specifically, it was more "acceptable" in Science, Psychology, and Social Science than in English and Creative Arts.

Results: Problem 6b. To compare attitudes of On Campus and At Home Television groups, t-ratios were computed. The results are summarized in Table 33.

Table 33

Summary of Results of a Comparison Between Television at Home and Television on Campus Groups in Science 10, Science 11, Psychology 10.1, and English 6.1

Course	Mean		t	Statistically Significant	Student Preference
	TV at Home	TV on Campus			
Science 10	47.9	50.5	1.18	No	Neutral
Science 11	46.9	52.4	4.01	Yes (.001)*	TV at Home
Psychology 10.1	45.3	50.3	2.21	Yes (.05)**	TV at Home
English 6.1	51.4	56.5	2.18	Yes (.05)**	TV at Home

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* Significant beyond the .1% level.

**Significant beyond the 5% level.

Television at Home received a higher rating in all four courses and results were significantly higher in three.

Results: Problem 6c. The question of whether students would take a second semester of television instruction in preference to a regular campus class was analyzed by the way students responded to two written questions. The questions (items 26 and 27 on Attitude to Television) were:

Question 1: If you have the option next semester of enrolling in either a television section or a conventional section of a particular course, which section will you choose? Assume that both sections are taught by the same instructor whom you like and at desirable hours which fit in with your schedule.

A. The television section
B. The conventional section

Question 2: Suppose the television section is being taught by an instructor who has the reputation of being an excellent teacher, whereas in the conventional section you have to take a chance on instructor assignment. Which section will you choose?

A. The television section
B. The conventional section

Results for Questions 1 and 2 appear in Tables 34 and 35 respectively.

Table 34

The Hypothetical Choices (TV Class or Conventional Class) Made by Students with TV Experience When Instructor Quality and Class Hour are Equal. Values are in Per Cent

Previous TV Experience

Choice of Next Course	Science 10		Science 11		Psych. 10.1		English 6.1		Social Science 30	Creative Arts 10
	At Home	On Campus	At Home	On Campus	At Home	On Campus	At Home	on Campus	At Home	At Home
Television	62	44	60	33	54	40	47	23	40	29
Conventional	38	56	40	67	46	60	53	77	60	71

Table 35

The Hypothetical Choices (TV Class or Conventional Class) Made by Students with TV Experience When Instructor Quality on TV is High. Values are in Per Cent

Previous TV Experience

Choice of Next Course	Science 10		Science 11		Psych. 10.1		English 6.1		Social Science 30	Creative Arts 10
	At Home	On Campus	At Home	On Campus	At Home	On Campus	At Home	on Campus	At Home	At Home
Television	82	78	81	77	80	87	64	64	71	65
Conventional	18	22	19	23	20	13	36	36	29	35

The responses varied from course to course and were most favorable to television instruction in Science and least favorable in Creative Arts. Further, Home viewers were more favorably disposed to a second semester of television instruction than were Campus viewers. Over-all, nearly one-half of the Television at Home students expressed preference for a second semester of television (other things being equal). However, if assured of a superior instructor, an overwhelming majority of Home viewers preferred television instruction. In three courses, over eighty per cent voted for television; in no course did the per cent fall below sixty-four.

Results: Problem 6d. Near the end of the Fall Semester a "behavioral choice" check was made of the students enrolled in Science 10. In effect, this was a validation of the hypothetical choice made on the attitude scale. The students completed a Pre-Registration Card on which they were required to indicate their choice of type of instruction (Television at Home, Television on Campus, Control, or no preference) for Science 11. Since nearly all the students who were enrolled in Science 10 and who passed the course continued in Science 11, the sample was considered representative of student behavior, at least in Science 10.

The results of this behavioral choice study appear in Table 36.

Table 36

Behavioral Choices of Students in Science 10 Who Decided to Take Science 11. Values Are in Per Cent

Actual Assignment in Science 10	Choice of Medium Prior to Science 10 TV at Home	TV on Campus	Control	Choice of Medium After Science 10 TV at Home	TV on Campus	Control
TV at Home	85	8	7	61	20	19
TV on Campus	0	87	13	9	48	43
Control	1	10	89	3	5	92

In general, students remained loyal to the medium which they had experienced in Science 10, although there were negative shifts for both experimental groups. Ninety-three per cent of the Television at Home group in Science 10 originally chose the television medium; at the end of the course, 81 per cent still indicated a preference for this medium. The corresponding per cents for Television on Campus were eighty-seven and fifty-seven. Apparently, the Television on Campus students were less loyal to the television medium than were the Television at Home students, while the Control students, without any television experience, did not appreciably change their attitude.

Problem 7

Is there a significant relationship between medium of instruction and interest in subject matter? Between supplementary discussion and interest in subject matter?

Results: Problem 7. The results on the Interest in Subject Matter scale[1] are summarized in Tables 37 through 41.

Table 37

Results on Interest in Subject Matter Scale in Science 10

Science 10	N	Mean	s.d.	F	Statistically Significant
Medium				13.57	Yes (.01)*
TV at Home	88	40.2	17.0		
TV on Campus	88	49.2	17.0		
Control	88	37.4	13.6		
Supplementary Discussion				1.19	No
Weekly	66	44.0	18.1		
Bi-Weekly	66	39.9	17.5		
Weekly Activity	66	41.0	15.4		
Home Assignment	66	44.0	15.6		
Interaction (Medium-Supplementary Discussion)				2.40	No

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* Significant beyond the 1% level.

Table 38

t ratios of Comparisons Among Media Groups on Interest in Subject Matter Scale in Science 10

Comparison	t	Statistically Significant
TV at Home vs. TV on Campus	3.67	Yes (.01)*
TV at Home vs. Control	1.24	No
TV on Campus vs. Control	4.71	Yes (.01)*

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* Significant beyond the 1% level.

Table 39

Results on Interest in Subject Matter Scale in Science 11

Science 11	N	Mean	s.d.	F	Statistically Significant
Medium				0.35	No
TV at Home	84	38.0	16.9		
TV on Campus	84	38.5	16.5		
Control	84	36.5	15.8		
Supplementary Discussion				0.55	No
Weekly	63	39.2	17.7		
Bi-Weekly	63	37.7	15.9		
Weekly Activity	63	35.5	16.0		
Home Assignment	63	38.2	16.0		
Interaction (Medium-Supplementary Discussion)				0.32	No

Table 40

Results on Interest in Subject Matter Scale in Psychology 10.1, English 6.1, Social Science 30, and Creative Arts 10

Course	N	Mean	s.d.	F	Statistically Significant
Psychology 10.1					
Medium				2.79	Yes (.05)*
TV at Home 1	27	37.3	15.9		
TV at Home 2	27	37.2	13.0		
TV on Campus	27	38.7	15.3		
Control	27	29.7	12.0		
English 6.1					
Medium				4.82	Yes (.05)*
TV at Home	26	38.0	16.5		
TV on Campus	26	51.7	21.8		
Control	26	37.5	17.3		
Social Science 30					
Medium				0.99	No
TV at Home 1	19	42.8	16.9		
TV at Home 2	19	43.1	14.8		
Control	19	36.9	14.8		
Creative Arts 10					
Medium				1.97	No
TV at Home	110	65.1	19.5		
Control	110	61.5	18.3		

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* Significant beyond the 5% level.

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[1] See Appendix M for the analysis of variance.

Table 41

t Ratios of Comparison Among Media Groups on Interest in Subject Matter Scale in Psychology 10.1

Comparison	t	Statistically Significant
TV at Home vs. TV on Campus....	0.33	No
TV at Home vs. Control	2.00	Yes (.05)*
TV on Campus vs. Control	2.39	Yes (.02)**

* Significant beyond the 5% level.
** Significant beyond the 2% level.

Of the three groups, the Control group expressed the greatest interest and the Television on Campus group the least interest in the subject matter being presented This statement is based on the following facts:

1. In three of the four courses the F-ratios were statistically significant (five per cent level for Psychology 10.1 and English 6.1; one per cent for Science 10). The occurrence of these significant F-ratios was primarily due to the lower level of interest expressed by the Television on Campus viewers.
2. Between Control and Television at Home, the Control groups, in all six courses, expressed themselves as more interested than did the At Home Television students. However, only in Psychology 10.1 was the difference in the means statistically significant (five per cent level).

Table 42

Results of Sociometric (Friendship) Study in Science 10, Science 11, Psychology 10.1, English 6.1, and Creative Arts 10. Values are in Per Cent

Course and Category	TV at Home Pre	TV at Home Post	TV on Campus Pre	TV on Campus Post	Control Pre	Control Post
Science 10						
Good Friend	10	17	8	13	15	25
Know Slightly....	14	23	13	27	19	36
Don't Like	1	2	0	1	1	1
Don't Know	75	58	79	59	66	38
Science 11*						
Good Friend			11	17	13	19
Know Slightly....			10	21	10	22
Don't Like			0	1	0	1
Don't Know			79	61	77	58
Psychology 10.1						
Good Friend	5	11	7	10	6	14
Know Slightly....	8	14	8	11	11	33
Don't Like	0	1	1	1	0	2
Don't Know	87	73	84	78	82	51
English 6.1						
Good Friend	11	16	13	21	7	14
Know Slightly....	6	17	8	17	5	19
Don't Like	1	1	1	1	0	1
Don't Know	82	66	79	61	88	66
Creative Arts 10**						
Good Friend	2	3			6	7
Know Slightly....	2	4			4	4
Don't Like	0	0			0	0
Don't Know	96	93			90	89

* Data for television at home group incomplete.
** No TV on Campus group.

Problem 8

Is there a significant relationship between medium of instruction and acquisition of friends and acquaintances? Between supplementary discussion and acquisition of friends and acquaintances?

At the beginning and at the end of the semester students in each group rated their classmates along a 7-point scale (later reduced to a 4-point scale).

Results: Problem 8. For each course[1], Table 42 shows the per cent of the ratings that fell in each category, and Table 43 gives the results of chi-square tests for significance.

Table 43

Summary of Pre- and Post-Results of Chi-Square Tests of Comparison Among Media Groups; A Sociometric (Friendship) Study of Science 10, Science 11, Psychology 10.1. English 6.1, and Creative Arts 10

Course	Chi-square Pre	Statistically Significant	Chi-square Post	Statistically Significant
Science 10	5.2	No	16.1	Yes (.05)*
Science 11	0.2	No	0.2	No
Psychology 10.1....	2.9	No	22.5	Yes (.01)**
English 6.1............	4.7	No	1.9	No
Creative Arts 10..	1.4	No	0.4	No

* Significant beyond the 5% level.
** Significant beyond the 1% level.

At the beginning of the semester the differences among the groups were statistically non-significant in all courses but, by the end of the semester, there were changes (see Tables 42 and 43). At the end of the semester the differences among the groups remained non-significant in three courses but, in the other two, significant differences were observed. In these two courses the members of the Control group apparently made more good friends and became acquainted with more class members than did the students in the corresponding Television group.

Problem 9

Do students' opinions toward certain aspects of television change from the beginning to the end of the semester?

Are the patterns of opinion essentially the same for Television and Control section students?

At the beginning and at the end of the semester students in each group, Television and Control, were asked to make a judgment on the following aspects of instruction: (1) learning, (2) attention, (3) personal contact with instructor, (4) preparation, and (5) course grade.

Question 1: Learning. Do you think you will learn (have learned) as much in this group as you will learn (would have learned) in the competing group?

Results: Learning. The per cent in each group giving a rating of "More," "Same," or "Less," is entered in Table 44. (The complete analysis is in Appendix N, Tables 87 through 90.)

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[1] Data were incomplete in Social Science 30 and Science 11, Television at Home.

Table 44

Pre- and Post-Results on Question 1: Amount of Learning. Values are in Per Cent

Course and Rating	TV at Home		TV on Campus		Control	
	Pre	Post	Pre	Post	Pre	Post
Science 10						
More	38	33	25	29	84	86
Same	50	35	38	28	16	12
Less	12	33	37	44	0	2
Science 11*						
More		31		14		78
Same		40		39		22
Less		29		47		1
Pschology 10.1						
More	12	44	32	6	92	57
Same	69	27	53	58	8	11
Less	19	29	15	36	0	32
English 6.1						
More	19	26	19	8	68	78
Same	52	26	33	27	21	16
Less	29	49	48	65	11	6
Social Science 30**						
More	35	26			88	76
Same	52	33			8	19
Less	13	41			4	5
Creative Arts 10**						
More	17	12			11	20
Same	54	33			39	48
Less	29	55			50	32

*Data were incomplete. **No TV at Home group.

With respect to "amount of learning," four out of five Control groups had a significantly higher expectation than the corresponding Television groups. Between the two Television groups, the Television at Home students had significantly higher expectations in all three courses.

The results on the questionnaire administered at the end of the semester indicated that the students' experiences confirmed their expectations. In every course, with one exception, the relative positions of the three major groups, Control, Television at Home, Television on Campus, remained as at the beginning.

Further, a comparison of expectation with realization showed that expectations were realized or even surpassed in four out of five Control groups but that expectations were not realized in four out of five Television at Home and in two out of three Television on Campus groups.

Finally, the comparison of post results in Science 10 with post results in Science 11 showed little change for Television at Home but some deterioration for Television on Campus.

Question 2: Attention. Do you think your attention will be held (was held) to the same degree in this group as it would be held (would have been held) in the competing group?

Results: Attention. The per cent in each group who gave a rating of "More," "Same," or "Less," appears in Table 45. (The complete analysis is in Appendix N.)

Table 45

Pre- and Post-Results in Question 2: Attention. Values are in Per Cent

Course and Rating	TV at Home		TV on Campus		Control	
	Pre	Post	Pre	Post	Pre	Post
Science 10						
More	46	41	25	29	91	91
Same	26	26	38	28	7	6
Less	28	34	37	44	2	3
Science 11*						
More		55		22		87
Same		22		28		11
Less		23		50		2
Psychology 10.1						
More	60	51	70	32	77	94
Same	17	16	24	32	20	6
Less	23	33	6	36	3	0
English 6.1						
More	36	32	26	16	66	84
Same	36	24	18	19	29	11
Less	28	45	56	65	5	5
Social Science 30**						
More	65	55			62	79
Same	17	14			19	8
Less	18	31			19	13
Creative Arts 10**						
More	34	18			15	19
Same	36	21			39	42
Less	30	61			46	39

*Data were incomplete. **No TV at Home group.

With respect to "Attention," three out of five Control groups had a significantly higher expectation than the corresponding Television groups. Between the two Television groups, Television at Home had significantly higher expectations in two out of three courses.

The results on the questionnaire given at the end of the semester indicated that the students' experiences confirmed their expectations. In every course the Control students gave a significantly more favorable rating to "Attention" than did the Television groups. Television at Home gave a more favorable rating than Television on Campus in three out of four courses.

Finally, for both Television at Home and Television on Campus, the post results in Science 10 did not differ significantly from post results in Science 11. Apparently, student opinions about "Attention" formed in Science 10 remained stable through Science 11.

Question 3: Personal Contact with Instructor. Aside from class meetings, how much personal contact do you feel you will have (would have had) with the instructor in this class compared with the contact you would have (would have had) in the competing class?

Results: Preparation. The per cent in each group giving ratings of "Better," "Same," or "Less" appears in Table 46. (The complete analysis is in Appendix N.)

Table 46

Pre- and Post-Results on Question 3: Personal Contact With Instructors. Values are in Per Cent

Course and Rating	TV at Home		TV on Campus		Control	
	Pre	Post	Pre	Post	Pre	Post
Science 10						
More	5	9	3	3	70	66
Same	38	29	20	12	25	31
Less	57	62	77	85	5	3
Science 11*						
More		5		1		48
Same		23		14		50
Less		72		85		2
Psychology 10.1						
More	3	7	0	3	75	64
Same	24	22	21	13	25	36
Less	73	71	79	84	0	0
English 6.1						
More	2	5	0	4	60	65
Same	29	36	22	11	37	30
Less	69	59	78	85	3	5
Social Science 30**						
More	2	0			50	28
Same	28	26			42	72
Less	70	74			8	0
Creative Arts 10**						
More	4	2			0	38
Same	24	17			30	47
Less	72	81			70	15

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*Data were incomplete. **No TV at Home group.

Table 47

Pre- and Post-Results on Question 4: Preparation. Values are in Per Cent

Course and Rating	TV at Home		TV on Campus		Control	
	Pre	Post	Pre	Post	Pre	Post
Science 10						
Better	45	27	56	11	46	37
Same	41	50	37	42	45	57
Less	14	23	7	47	9	6
Science 11*						
Better		18		7		36
Same		45		41		57
Less		37		52		7
Psychology 10.1						
Better	43	26	47	9	52	26
Same	45	37	41	28	43	66
Less	12	37	12	62	5	9
English 6.1						
Better	38	18	19	4	37	43
Same	38	32	37	27	58	52
Less	24	50	44	69	5	5
Social Science 30**						
Better	48	8			58	43
Same	44	41			35	52
Less	8	51			8	5
Creative Arts 10**						
Better	16	5			10	11
Same	60	23			61	76
Less	24	72			29	13

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*Data were incomplete. **No TV at Home group.

Students in the televised classes felt they had less personal contact with their instructor than they would have had in a conventional class. Students in the Control classes were emphatic in the feeling they had more personal contact in a conventional class than they would have had in a Television class. Differences were so great that no tests for significance were made.

Question 4: Preparation. How well prepared (reading textbook, assignments, studying notes, etc.) do you feel you will be (were) for each class meeting compared to the preparation that would be necessary (would have been necessary) in the competing class?

Results: Preparation. The per cent in each group giving ratings of "Better," "Same," or "Less" appears in Table 47. (The complete analysis is in Appendix N, Tables 94 and 95.

At the beginning of the semester, Control students and Television students in four out of five courses did not differ significantly in their expectations as to how well prepared they would need to be for each class meeting. At the end of the semester the picture had changed; the students in the Control sections of all six courses felt a greater need to be well prepared for each class meeting than did the students in the Television groups. Further, the students in Television at Home groups felt a significantly greater need than did the Television on Campus students.

Question 5: Course Grade. How do you think your course grade will compare (compared) with the grade you would receive (would have received) in the competing class?

Results: Course Grade. The per cent in each group giving a rating of "Higher," "Same," or "Lower" appears in Table 48.

Table 48

Pre- and Post-Results on Question 5: Opinion on Course Grade. Values are in Per Cent

Course and Rating	TV at Home		TV on Campus		Control	
	Pre	Post	Pre	Post	Pre	Post
Science 10						
Higher	16	29	36	48	55	60
Same	73	55	57	41	43	36
Lower	11	16	7	11	2	4
Science 11*						
Higher		33		48		40
Same		53		40		53
Lower		14		12		7
Psychology 10.1						
Higher	10	32	3	33	47	22
Same	81	59	88	67	53	61
Lower	9	9	9	0	0	17
English 6.1						
Higher	36	41	34	61	23	30
Same	48	38	59	31	62	62
Lower	16	21	7	8	15	8
Social Science 30**						
Higher	23	32			19	43
Same	65	59			77	52
Lower	12	9			4	5
Creative Arts 10**						
Higher	14	45			25	10
Same	80	46			71	70
Lower	6	9			4	20

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*Data were incomplete. **No TV at Home group.

Opinions on course grade varied widely from course to course. No consistent pattern was evident.

Summary and Discussion of Area I—College Students: Objective Appraisal

Area I included nine major problems and many of these had sub-problems. The problems included studies of achievement, critical thinking, self-insight, attitude to course content, attitude to instructor, attitude to television, interest in subject matter, student friendships, student opinions toward certain aspects of television instruction, and behavioral choice between conventional and televised instruction. Although conflicting results did occur, a number of clear-cut patterns were evident.

1. **Achievement.** When the criterion was acquisition of general content, no one medium was found to be superior to the others. However, when the final examination was employed as a criterion, the Television at Home groups in five of the six courses reached a higher level of achievement than did the other two groups. However, in three of these five cases, the observed differences were not statistically significant. No one medium was generally superior to others in promoting content acquisition when high and low academic ability groups were studied. Further, there was no evidence that differences in the form of supplementary discussion groups significantly affected performance. However, the mean scores of the Home Assignment groups in Science 10 and Science 11 did rank last in five of six cases.

The conclusion: With respect to mastery of course content or, as in English 6.1, the ability to compose essays, students in television classes reached a level of achievement which compared favorably with that of students in regular campus classes. This conclusion was consistent with results obtained at the College for the first year of experimentation and with findings elsewhere.

Results for the Creative Arts course ran counter to the general conclusion. On both measures, achievement gain and final examination, the Control group significantly out-performed the Television at Home group.[1] In interpreting this result, some additional facts about the course appear pertinent at this juncture. In several respects, Creative Arts 10 was unlike the other courses in this study. For one thing, the Control group was very large and necessarily included students who were not participants in the study. This came about because the course was declared a requirement in General Education and substitutions were not readily allowed. Since the Control section was the only one most students could enter, no limitation on enrollment was feasible. Further, a novel schedule of laboratory experiences was instituted for the At Home group; instead of one-hour weekly campus laboratory meetings, five three-hour tri-weekly night meetings were scheduled. The laboratory experience gave exposure to several art forms, each led by a specialist. Thus, the rule for the Television group was infrequent contact with instructors and little continuity of contact with any one instructor. Finally, the course was open to any undergraduate; this meant the students were more heterogeneous than subjects in the other courses. The separate effects of these factors, and others, were difficult to estimate and their interaction was unknown. It is possible these uncontrolled variables affected the results.

2. **Critical Thinking.** No significant differences in mean gains in critical thinking scores were found among the three media nor among the supplementary discussion groups (Science 10 and Science 11). From these data the most obvious conclusion is that one medium is about as effective as another in promoting critical thinking, and that supplementary discussion, weekly or bi-weekly, has no noticeable effect on critical thinking. However, before such an interpretation of the data is accepted, additional factors should be considered. For example, the error of measurement may have exceeded true gain. A factor that contributes to error of measurement is the variation in student performances. Students may have been highly motivated for the pretest, and they may have performed "over their heads." On the other hand, students may have had less motivation for the posttest and, as a result, their final performance may have been negatively affected. Furthermore, the suggested conclusion may not hold for situations that allow for repeated testing over long periods of time.

3. **Self-Insight.** Although the mean gains in self-insight scores were greater for the Control than for the Television groups in five of the six courses, no statistically significant differences were found. Neither was there evidence that the four types of supplementary discussion in Science 10 and Science 11 had differential effects on self-insight. These results were consistent with the results from the first year in two ways: (1) There were no differences among media, and (2) There were some differences in gains among the courses.

4. **Attitude to Course Content.** Attitudes of Television at Home and Control students to course content were generally favorable and not statistically different from each other. Television on Campus groups' attitudes were the least favorable in all courses; in fact, in Science 10, the differences between means scores of On Campus viewers and of other viewers were statistically significant. Further, there was no evidence that small group discussion in Science 10 and Science 11 significantly affected student attitude to course content.

5. **Attitude to Instructor.** Attitudes to instructor followed the same pattern as attitudes to course content. Television at Home and Control groups gave ratings which, in five of six courses, did not differ significantly from each other. However, students in Television on Campus classes usually expressed less favorable attitudes than did the other two groups; in fact, the observed differences were statistically significant in three of four courses. On the over-all rating of instructor effectiveness, students in five of the six courses rated their instructors very high. Again, Control and Television at Home students gave more favorable evaluations than did the On Campus viewers.

6. **Attitude to Television.** Television instruction was "accepted" as a medium of instruction in seven of ten groups; that is, attitudes were either favorable or neutral. Television was not favored in English (Television on Campus), Science 11 (Television on Campus), and in Creative Arts (Television at Home). About one-half the students who experienced televised instruction indicated they

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[1] There was no Television on Campus group in Creative Arts 10.

would enroll the following semester in a hypothetical televised course, other things being equal. Sixty-four to eighty-seven per cent of the students said they would take another televised course if assured of a superior instructor for the second semester. A behavioral choice check made of students in Science 10 at the end of the semester, and about the time student programs were being planned for the Spring Semester, showed that the students continuing with Science 11 generally remained loyal to the medium of instruction they had experienced in Science 10. Eighty-one per cent of Television at Home students chose either Television at Home or Television on Campus; fifty-seven per cent of the Television on Campus students decided in favor of another television course; few of the Control students decided to take a televised section. The data support the conclusion that students who experience a televised course may be expected to enroll in another televised course, especially if they are assured that the television instructor will be superior. This conclusion is in agreement with studies made at the University of Miami. Further, the data support the finding of the first report, namely, Television at Home is preferred to Television on Campus.

Why Television at Home should be preferred to Television on Campus is of interest. The first report suggests that listening to a lecture via television in one's home should not be appreciably different from viewing and listening at school; yet, in course after course, the results are consistently in favor of Television at Home. Speculation appears in order: (1) To a viewer in a classroom, an instructor on a television screen may appear more remote than the same instructor may appear to a viewer in a private home; (2) Television on Campus viewers had no personal contact with the television instructor, and this may have precipitated a negative reaction to television; (3) Television on Campus may have had more distractions that negatively influenced attitudes to television than did Television at Home; (4) Students, who have become accustomed to watching commercial television in the intimate setting of the home, may have transferred such acquired behavior more readily to instructional Television at Home than to Television on Campus. Further investigation along these lines is suggested.

7. Interest in Subject Matter. Television at Home and Control groups expressed themselves as more interested in the subject matter of the course than did the Television on Campus students. The results again parallel the rankings of the media on the various attitude scales. Between Control and Television at Home groups, the former usually expressed themselves as the more interested in subject matter; however, in only one instance was the difference statistically significant.

8. Sociometric Study. The data from the Sociometric Instrument are consistent with the findings from the first report, that is, Control groups fostered friendships more frequently than did Television groups. However, differences among groups were significant only in two courses, Science 10 and Psychology 10.1. An interesting relationship was observed: Control groups in Science 10 and Psychology 10.1 made larger gains on self-insight and made more friends than did the other groups.

9. Opinions toward Selected Aspects of Television: Generally, students in Control groups expressed the opinions that they had learned more, paid better attention, had more personal contact with instructors, and prepared better for class than if they had been assigned to a Television group. As a rule, students in Television at Home courses ranked second in these same aspects, and Television on Campus was third. No consistent opinions about grades could be discerned among the six courses.

The difficulty of comparing opinions of groups which experience different media of instruction is complicated by the fact that one group which may not have had the experience of a second group is, nevertheless, expected to make evaluations in terms of the second group's experience. In this study, since the Control groups had no television experience while the Television groups did have conventional experiences, about all that could be done was to administer a pre- and post-opinionnaire and, from this, to estimate changes of opinion. However, these opinions generally did not appear to be related to the actual achievement of the students as estimated by the subject matter tests.

Area II: High School Students — Objective Appraisal[1]

Problem 10

How does the achievement of high school groups compare with that of college On Campus groups with whom they are matched on the basis of S.C.A.T. scores?

The high school groups were most similar to the college On Campus classes. Both groups met in classrooms with identical television sets. In the case of English 6.1, both groups had a regular instructor present; in Science 11, only the high school students had a teacher in attendance. The same evaluation instruments were used as in the college experiment; whenever possible, subject matter tests were given the same day. For Science 11, the groups in the high schools were matched with the college groups on S.C.A.T. and were comparable on pretest content. For English 6.1 the comparison groups were matched on S.C.A.T. and found comparable on the Cooperative English test.

Results. Data were analyzed by t-ratios and chi-square tests of significance. Table 49 summarizes the results of the comparisons.

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[1] For a description of methods and materials see page 13.

Table 49

Summary Results of Comparisons of High School Groups With College Groups in Science 11 and English 6.1

Subject and Test	High School		College		t	Statistically Significant
	N	Mean	N	Mean		
Science 11						
Pretest	57	35.2	57	34.9	0.21	No
Posttest Gain	57	15.4	57	21.7	3.40	Yes (.005)*
Final Exam	57	79.5	57	90.1	3.74	Yes (.005)*
English 6.1						
Pretest	48	172.8	24	134.1	5.92	Yes (.001)**
Posttest Gain	48	8.5	24	32.3	3.19	Yes (.005)*

*Significant beyond the .5% level.
**Significant beyond the .1% level.

For Science 11, the college group had significantly higher mean scores in both post content test and final examination. For English 6.1, the mean score of the high school students on the pretest was higher than that of the college students. By the end of the semester both groups had higher mean scores, but the increase for the college students was significantly higher than that for the high school students. Nonetheless, the posttest mean for the college group was still lower than that for the high school group.

Problem 11

Do high ability high school students reach a satisfactory level of achievement when taking a college course by television?

High ability for high school students was defined as a S.C.A.T score of 302 or higher and corresponded to the upper twenty-seven per cent of San Francisco State College freshmen. Achievement was approximated by final grades assigned by the College.

Results. Table 50 presents a distribution of final grades for Science 11 and English 6.1.

Table 50

Final Grades for High Ability High School Students in Science 11 and English 6.1

Final Grade	Science 11 N=19	English 6.1 N=42
A	3	4
B	2	14
C	8	13
D	1	2
F	3	0
Inc.*	2	9

* This category includes students who started the course but, for one reason or another, did not complete course requirements.

By inspection, the distribution of grades for both courses does not appear unusual for these courses although the number of incompletes in English 6.1 is somewhat high for a group of forty-two students.

Problem 12

What is the nature of the rating given by high school students to course content, to instructor, and to the television medium? Does a televised college course hold the interest of high school students?

Results. The results of the four attitude scales are summarized in Table 51.

Table 51

Summary of Results on Four Attitude Scales by High School Students Enrolled in Science 11 and English 6.1

Course and Attitude Scale	N	Mean	s. d.	t[1]	Statistically Significant	Student Attitude
Science 11						
Course Content	88	38.3	13.5	—9.78	Yes (.001)*	Favorable
Instructor	82	32.8	13.5	—11.15	Yes (.001)*	Favorable
Television	88	47.3	9.0	—2.54	Yes (.02)**	Favorable
Subject Matter	78	37.8	20.8	—6.44	Yes (.001)*	Favorable
English 6.1						
Course Content	160	41.3	11.3	—8.20	Yes (.001)*	Favorable
Instructor	156	34.7	13.9	—13.87	Yes (.001)*	Favorable
Television	157	52.9	9.9	1.26	No	Neutral
Subject Matter	152	42.3	16.8	—4.55	Yes (.001)*	Favorable

* Significant beyond the .1% level.
** Significant beyond the 2% level.

[1] $t = \frac{\bar{X}_1 - 50}{\frac{s}{\sqrt{N}}}$

In both courses the high school students had a favorable attitude to content and to instructor and expressed themselves as very interested in the subject matter of the course. Attitude to television as a medium of instruction was favorable in Science 11 and neutral in English 6.1.

Problem 13

Are the high school students' ratings on course content, instructor, and television significantly different from those of college On Campus viewers? Do the two groups differ with respect to interest in the subject matter of the course?

Results. The results on the four attitude scales are summarized in Table 52.

In English 6.1, the high school students gave a more favorable rating to television, to course content, and to instructor than did college On Campus viewers (5% level of significance); they also expressed more interest in the subject matter of the course (5% level). On attitude to television, both group means were on the negative side of neutral (Score 50).

However, in Science 11, the differences in the means were non-significant on three out of four scales: attitude to course content, attitude to instructor, and interest in subject matter. Only on the attitude to television scale was there a significant difference; here, as in English 6.1, the high school group gave television the more favorable rating (.1% level of significance). However, the difference of the high school mean (47.3) from 50 was not great.

Table 52

Comparison (t ratios) of Attitude Between High School Students and College Students on Four Attitude Scales in Science 11 and English 6.1

Course and Attitude Scale	N	High School Mean	s.d.	N	College Mean	s.d.	t[1]	Statistically Significant
Science 11								
Course Content	88	38.3	13.5	104	40.1	11.4	1.08	No
Instructor	82	32.8	13.5	103	34.5	13.1	0.88	No
Television	88	47.3	9.0	102	52.4	8.5	3.61	Yes (.001)*
Subject Matter	78	37.8	20.8	103	39.7	21.8	0.84	No
English 6.1								
Course Content	160	41.3	11.3	26	47.0	12.1	2.03	Yes (.05)**
Instructor	156	34.7	13.9	26	41.2	11.4	2.29	Yes (.05)**
Television	157	52.9	9.9	26	56.5	9.5	2.04	Yes (.05)**
Subject Matter	152	42.3	16.8	26	51.7	17.0	2.13	Yes (.05)**

*Significent beyond the .1% level.
**Significant beyond the 5% level.

[1] $t = \frac{\overline{X}_2 - \overline{X}_1}{s_p\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}$

Summary and Discussion of Area II — High School Students: Objective Appraisal

Achievement

In Science 11, in which the two groups were initially comparable on S.C.A.T. and the science content pretest, the final achievement level of the college students was significantly higher than that of the high school group.

In English 6.1, in which the groups were initially comparable on S.C.A.T. and Cooperative English but not in essay writing skills, the college students made significantly greater gains than did the high school group. Nonetheless, due to lower initial scores in essay writing, the posttest mean of the college students did not reach the high school pretest mean.

The distribution of college grades assigned to high ability high school students was not unusual except that the number of incompletes assigned to high school students was judged to be higher than was normal for college students.

Inasmuch as the high school and college groups were roughly comparable at the outset, the differences in final performance suggest that the motivation of the groups differed. (1) The college students were formally registered in the televised courses and, in effect, had a written contract to complete the courses. There was no agreement for the high school students and they could, at any time during the semester, decide not to complete the college requirements. (2) Science 11 was a five-unit course for college students and represented one-third of the average academic program. Success or failure was important for failure would affect retention or expulsion from the college on academic grounds. Further, failure for the men could have meant a negative academic report to their respective Selective Service Boards, provided they were eligible for military service. These factors were not operative for the high school students. (3) The college students had, more or less, a commitment to achieve at the college, since the result of their performances would become a permanent part of their academic record. The high school students had no such commitment to the College; however, if and when they enrolled, they had the option of applying for the college credit they had earned in high school. (4) The atmosphere of a college tends to support intensive academic pursuit. Such differences, it is believed, may have had effects on the final results for the two groups.

In English 6.1, the motivational forces appear to have been supplemented by additional factors. The final results for the two groups showed a greater gain for the college students than for the high school students. Some factors which may have been at work follow. (1) The high school classes got under way some two weeks prior to college classes. Further, the high school classes met daily, while the college classes met but twice a week. Thus, at the time of the first essay, the high school students had received a lengthier "warm-up" period. (2) The impression received by the research staff was that the high school students were initially highly motivated; this heightened motivation may have resulted in superior initial compositions. (3) Due to high school end-of-semester activities, it was necessary to adjust the assignment and due dates for the final essay (posttest). (4) It is more difficult to make marked improvement after a good performance than it is to make an improvement after a poor or mediocre performance, other things being equal, and this principle may well have been functioning here. The initial performance of the high school students was high, but the amount gained by the college students was higher than that of the high school students. However, it may be that the relatively small final gain of the high school students indicates a more difficult earned gain than the relatively larger final gain made by the college students.

Attitudes

The high school students were favorably disposed to course content and to instructors, and evidenced considerable interest in subject matter. Attitude to television as a medium of instruction was favorable in Science but neutral in English. Between college and high school students who were enrolled in English 6.1, the latter generally were significantly more favorably inclined to course content and to the instructor, and evidenced greater interest in subject matter. Both groups expressed negative attitudes to television, but the high school students' attitudes were significantly less negative than those of the college students. For Science 11, the two groups generally did not differ; the direction, with the exception of one college group, for both groups was favorable to televised instruction.

Two major conclusions seemed to be suggested by the data. (1) Selected high school students whose academic aptitude and whose initial achievement were comparable or superior to selected college students made smaller mean gains than the college students. (2) High school students' reactions to college courses offered by television compared favorably with college students.

Area III: The Follow-Up Study[1]

Problem 15

Do students give substantially the same rating to two required courses in the same subject, one taken by television, the other in a regular campus class?

In this study, the students were asked to compare two English courses, one taken in a regular class and one taken via television. At San Francisco State College, English 6.1 (3 semester units) and English 6.2 (3 semester units) are required freshman courses in the general education program. Thus, nearly all continuing students who completed English 6.1 via television in the Spring Semester 1957 enrolled in English 6.2 in a regular campus class in the Fall Semester 1957. There were thirty students in this category, spread among seven different English 6.2 classes taught by seven different instructors. These students were asked to fill out, on an anonymous basis, a questionnaire comparing their experiences in televised instruction (English 6.1) with their experiences in a regular campus class (English 6.2).

Results: Twenty-five students or eighty-three per cent of those who enrolled for the second half of the year course completed the questionnaire. The results follow.

Questionnaire

1. Do you think you *learned as much* by means of TV as you are learning in this regular campus class?
   a. More by TV 4%
   b. More in regular campus class 58%
2. How well did the TV class *hold your attention* compared with this regular campus class?
   a. TV held attention more 17%
   b. Regular campus class held attention more 71%
3. Aside from class meetings, how much personal contact did you feel you had with the TV instructor compared to the contact you are now having in this regular campus class?
   a. More contact in TV class 12%
   b. More contact in regular campus class 63%
4. How well prepared (reading textbook assignments, studying notes, etc.) did you have to be for each TV class compared with preparation for this regular campus class?
   a. Better prepared for TV class 25%
   b. Better prepared for regular campus class 38%
5. How do you think your course grade in this class will compare with the grade you received in the TV class?
   a. Higher in TV class 33%
   b. Higher in regular campus class 29%
6. Does the course material seem as significant (important) when studied in this regular campus class as it did when you took it on TV?
   a. More significant, more important on TV 17%
   b. More significant, more important in regular campus class 42%
7. Where did you find the greatest number of elements that distracted from the lectures —in the course via TV or in this regular campus class?
   a. Greater number in the course via TV 68%
   b. Greatest number in this regular campus class 4%
8. How does your enjoyment of this regular campus class compare with your enjoyment of the TV class?
   a. TV class more enjoyable 24%
   b. Regular campus class more enjoyable 60%
9. Do you think that there is as much individual attention being given to improving your competency in English (Basic Communications)in this regular class as in the TV class?
   a. More in the TV class 20%
   b. More in the regular campus class 43%
10. Do you wish you were taking English 6.2 by means of TV *this semester?*
    a. Yes 12%
    b. No 80%
    c. No preference 8%

Eighty per cent of the students preferred the regular English 6.2 campus class. The reasons given by the students were evident: greater learning, more interesting, enjoyable and significant content; more individual attention from and greater personal contact with their instructor. The attitudes of these students did not appear to have changed materially from the end of the English 6.1 course. At that time the students were asked to choose from among three types of courses, Television at Home, Television on Campus, and Regular Campus. The favored medium was Regular Campus, that is conventional instruction.

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[1] For a description of methods and materials see page 13.

Area IV: Attitudes Toward the Teaching-Learning Process[1]

Three major problem areas were identified. The assumptions that undergirded each of the problems is stated, then followed by statements of the problem and sub-problems. Next, data relating to each specific problem is presented. Finally, a summary of results and a discussion conclude this portion of the study.

Problem 15: Over-all Differences in Number and Kind

The assumption was made that the number of critical incidents clustering about televised or conventional classroom instruction and, in particular, patterns about sub-categories would indicate the *intensity* of response to teaching-learning processes in these media. The differences in kind of critical incidents would indicate the *range* of responses to these processes.

Is there a significant difference in the over-all number of critical incidents between *televised* and *conventional classroom* instruction when *effective* and *ineffective* processes are combined?

Results: Of a total of 4623 responses from 833 subjects, 305 separate critical incidents were identified. The distribution of responses by groups can be found in Appendix 0. The over-all results appear in Table 53.

Table 53

Comparison of the Over-all Difference in Number of Critical Incidents between Televised and Conventional Instruction

Total	Television Effective	Television Ineffective	Classroom Effective	Classroom Ineffective	Chi-Square	Statistically Significant
305	129		176		7.24	Yes (.01)*

*Significant beyond the 1% level.

Although students were given equal opportunity to describe effective and ineffective televised and conventional instructional experiences, the subjects had significantly more to describe, both "good" and "bad," in conventional instruction than in televised instruction.

Problem 15a: Number of Incidents

Is there a significant difference in the over-all number of critical incidents (each critical incident describes one kind of process) between *effective televised* instruction and *effective classroom* instruction? Between *ineffective televised* instruction and *ineffective classroom* instruction?

1. In each sub-category (A through F), are there significant differences in the number of critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?
2. In each group (Experimental, Teachers, and High School) in each sub-category (A through F), are there significant differences in the number of critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?

Results: Problem 15a: Number of Incidents. Table 54 includes data about all parts of Problem 15a except 15a2; the data for this sub-problem appears in Table 55.

Table 54

Comparisons of Numbers of Critical Incidents Between Televised and Classroom Instruction (All Groups Combined)

Category Sub-category	Number of Incidents TV	Number of Incidents Classroom	Chi-Square	Statistically Significant
Effective Teaching-Learning Process				
A (Teacher Initiated Behavior)	23	20	†	
B (Student Initiated Behavior)	23	8	†	
C (Student-Teacher Interaction)	0	8	†	
D (Class Interaction)	4	20	†	
E (Method and Material)	9	10	†	
F (Physical Aspects)	12	0	†	
Over-all	71	66	.19	No
Ineffective Teaching-Learning Process				
A (Teacher Initiated Behavior)	16	53	19.84	Yes (.001)*
B (Student Initiated Behavior)	9	15	1.50	No
C (Student-Teacher Interaction)	0	8	3.38‡	No
D (Class Interaction)	10	20	3.34	No
E (Method and Material)	7	4	.02‡	No
F (Physical Aspects)	16	10	1.38	No
Over-all	58	110	16.10	Yes (.001)*

*Significant beyond the .1% level.
†The chi-square was not computed because the over-all chi-square was not significant.
‡Corrected for continuity.

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[1] For a description of rationale and methods see page 13.

[2] An example of a critical incident drawn from "Effective Television" is: Student feels relaxed, is alone and able to eat, smoke, etc. Appendix O lists all critical incidents.

Table 55

Comparisons of Numbers of Critical Incidents Between Ineffective Televised and Ineffective Classroom Instruction Within Sub-categories A-F by Experimental, High School and Teacher Groups

Group Sub-category	Number of Incidents Ineffective TV	Ineffective Classroom	Chi-Square	Statistically Significant
Experimental				
A (Teacher Initiated Behavior)	16	47	15.26	Yes (.001)*
B (Student Initiated Behavior)	9	14	†	
C (Student-Teacher Interaction)	0	8	†	
D (Class Interaction)	10	18	†	
E (Method and Material)	7	4	†	
F (Physical Aspects)	16	8	†	
High School				
A (Teacher Initiated Behavior)	13	19	1.12	No
B (Student Initiated Behavior)	9	5	†	
C (Student-Teacher Interaction)	0	4	†	
D (Class Interaction)	6	10	†	
E (Method and Material)	7	2	†	
F (Physical Aspects)	10	3	†	
Teachers				
A (Teacher Initiated Behavior)	8	5	.70	No
B (Student Initiated Behavior)	3	2	†	
C (Student-Teacher Interaction)	0	4	†	
D (Class Interaction)	2	5	†	
E (Method and Material)	2	1	†	
F (Physical Aspects)	8	4	†	

Note: The chi-square for the sub-categories B, C, D, E, and F (Table 54) were not significant; therefore, no further analyses were made.

*Significant beyond the .1% level.

†Chi-square not computed because over-all chi-square was not significant.

The comparison between effective televised and effective classroom instruction by over-all number of critical incidents was found to be non-significant. This finding limited further statistical analysis by sub-categories and by subject groups (Experimental, Teachers, High School).

The findings for ineffective processes were significant on an over-all basis, and significant on sub-category A (Teacher Initiated Behavior). Ineffective Teacher Initiated Behavior processes made up nearly half the ineffective classroom incidents. When the data were analyzed by the three groups, it was found (Table 55) that only the Experimental group, that is, college students who had television experience, identified a significantly greater number of Teacher Initiated ineffective critical incidents when televised and conventional instruction were compared.

Problem 15b: Kinds of Incidents

Is there, over-all, significantly more similarity than dissimilarity among the critical incidents when (1) effective televised instruction is compared with effective classroom instuction; when (2) ineffective televised instruction is compared with ineffective classroom instruction?

1. In each sub-category (A through F), are there significant differences in the *kinds* of critical incidents when *effective televised* instruction is compared with *effective classroom* instruction?
2. Are there significant differences, over-all, between media (televised versus classroom), and in each sub-category, in the number of *dissimilar* incidents describing *effective* instruction?

Results: Problem 15b: Kinds of Incidents. Table 56 and 57 include data relating to effective incidents.

Table 56

Kinds of Critical Incidents Identified as Similar and Dissimilar When Effective Televised and Effective Classroom Intruction Were Compared

Category Sub-category	Incidents	Similar Incidents	Dissimilar Incidents	Chi-Square	Statistically Significant
Effective Teaching-Learning Process					
A (Teacher Initiated Behavior)	43	20	23	0.20	No
B (Student Initiated Behavior)	31	2	29	6.73	Yes (.01)**
C (Student-Teacher Interaction)	8	0	8	3.38	No
D (Class Interaction)	24	6	18	6.00	Yes (.05)*
E (Method and Material)	19	10	9	0.06	No
F (Physical Aspects)	12	0	12	4.69	Yes (.05)*
Overall	137	38	99	7.39	Yes (.05)*

**Significant beyond the 1% level.

*Significant beyond the 5% level.

Table 57

Number of Critical Incidents Identified as Similar and Dissimilar When Effective Televised Instruction and Effective Classroom Instruction Were Compared

Category Sub-category	Incidents	Similar Incidents	Dissimilar Incidents	Chi-Square	Statistically Significant
Effective Teaching-Learning Process					
A (Teacher Initiated Behavior)	23	13	10	†	
B (Student Initiated Behavior)	29	22	7	†	
C (Student-Teacher Interaction)	8	0	8	†	
D (Class Interaction)	18	1	17	†	
E (Method and Material)	9	7	2	†	
F (Physical Aspects)	12	12	0	†	
Over-all	99	55	44	1.22	No

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†Chi-square not computed because over-all chi-square not significant.

Over-all, there were significantly more dissimilar experiences than similar incidents described in both televised and conventional instruction. Further, dissimilarity of experiences was found in three of the six sub-categories; the exceptions were Teacher Initiated Behavior (A), Student-Teacher Interaction (C), and Application of Method and Material (E).

In addition, no significant differences were observed when dissimilar incidents were compared (Table 57) on an over-all basis. Hence, no further tests were made of possible differences in sub-categories. However, inspection of Table 57 indicates several interesting differences, particularly Student Initiated Behavior (B), Class Interaction (D), and Physical Aspects (F). B and F have larger values in the column headed Television, while D has a larger value in the column headed Classroom.

Problem 15c: Similar and Dissimilar Ineffective Incidents

Is there more similarity than dissimilarity in the critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?

1. In each sub-category (A through F), are there significant differences in the *kinds* of critical incidents when *ineffective televised* instruction is compared with *ineffective classroom* instruction?
2. Are there significant differences between over-all media, and in sub-categories, in the number of *dissimilar* incidents describing *ineffective* instruction?
3. Are there differences, over-all, between media and in each sub-category *within groups*, in the number of *dissimilar* incidents describing *ineffective* instruction?

Results: Problem 15c. The data relating to 15c and its sub-parts are found in Tables 58, 59 and 60.

Table 58

Kinds of Critical Incidents Identified as Similar and Dissimilar When Ineffective Televised and Ineffective Classroom Instruction Were Compared

Category Sub-category	Incidents	Similar Incidents	Dissimilar Incidents	Chi-Square	Statistically Significant
Ineffective Teaching-Learning Process					
A (Teacher Initiated Behavior)	69	18	51	15.78	Yes (.001)***
B (Student Initiated Behavior)	24	6	18	6.00	Yes (.05)*
C (Student-Teacher Interaction)	8	0	8	3.38†	No
D (Class Interaction)	30	6	24	10.8	Yes (.01)**
E (Method and Material)	11	2	9	1.62†	No
F (Physical Aspects)	26	6	20	7.54	Yes (. 01)**
Over-all	168	38	130	13.91	Yes (.001)***

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*Significant beyond the 5% level.
**Significant beyond the 1% level.
***Significant beyond the .1% level.
†Corrected for continuity.

Table 59

Number of Critical Incidents Identified as Dissimilar When Ineffective Televised Instruction and Ineffective Classroom Instruction Were Compared

Category Sub-category	Total Dissimilar	Television	Classroom	Chi-Square	Statistically Significant
Ineffective Teaching-Learning Process					
A (Teacher Initiated Behavior)	51	6	45	29.82	Yes (.001)**
B (Student Initiated Behavior)	18	6	12	2.00	No
C (Student-Teacher Interaction)	8	0	8	3.38†	No
D (Class Interaction)	24	7	17	4.16	Yes (.05)*
E (Method and Material)	20	13	7	1.80	No
F (Physical Aspects)	9	6	3	0.11†	No
Over-all	130	38	92	22.44	Yes (.001)**

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*Significant beyond the 5% level.

**Significant beyond the .1% level.

†Corrected for continuity.

Table 60

Number of Critical Incidents Identified as Dissimilar When Ineffective Televised Instruction and Ineffective Classroom Instruction Within Groups Were Compared

Group Sub-category	Dissimilar	Television	Classroom	Chi-Square	Significant
Experimental					
A (Teacher Initiated Behavior)	47	7	40	23.16	Yes (.001)*
B (Student Initiated Behavior)	20	6	14	3.20	No
C (Student-Teacher Interaction)	8	0	8	3.38†	No
D (Class Interaction	22	7	15	2.90	No
E (Method and Material)	9	6	3	.11†	No
F (Physical Aspects)	19	13	6	2.58	No
High School					
A (Teacher Initiated Behavior)	19	4	15	1.96†	No
B (Student Initiated Behavior)	9	6	3	.11†	No
C (Student-Teacher Interaction)	4	0	4	2.08†	No
D (Class Interaction)	11	4	7	.02†	No
E (Method and Material)	7	6	1	.05†	No
F (Physical Aspects)	12	10	2	.03†	No
Teacher					
A (Teacher Initiated Behavior)	11	6	5	.08	No
B (Student Initiated Behavior)	2	0	2	1.50†	No
C (Student-Teacher Interaction)	4	0	4	2.08†	No
D (Class Interaction)	4	0	4	2.08†	No
E (Method and Material)	2	2	0	1.50†	No
F (Physical Aspects)	11	8	3	.38†	No

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*Significant beyond the .1% level.

†Corrected for continuity.

Over-all, there were significantly more dissimilar incidents than similar incidents. Dissimilarity was observed in all but two sub-categories, Method and Material (E), and Student-Teacher Interaction (C). Further, when dissimilarity was studied by comparing television with classroom instruction, there was an over-all difference and there were sub-category differences only in Teacher Initiated Behavior (A) and Class Interaction (D). In both cases the classroom had the larger number of dissimilar experiences. Finally, when dissimilarity was studied by groups, only one significant difference was found: The Experimental group experienced more dissimilar ineffective Teacher Initiated Behavior in the classroom than it experienced by the television medium.

Problem 15d: Similar and Dissimilar Effective Incidents.

In each group (Experimental, Teachers, and High School), in each sub-category (A through F) are there significant differences in the *kinds* of critical incidents when (1) *effective televised* instruction is compared with *effective classroom* instruction; when (2) *ineffective televised* instruction is compared with *ineffective classroom* instruction?

Results: The data are found in Tables 61 and 62.

Table 61

Kinds of Critical Incidents Identified as Similar and Dissimilar When Effective Televised Instruction and Effective Classroom Instruction Were Compared Within Sub-categories A-F in Experimental, High School and Teacher Groups

Group Sub-category	Incidents	Similar Incidents	Dissimilar Incidents	Chi-Square	Statistically Significant
A (Teacher Initiated Behavior)					
Experimental	41	18	23	†	
High School	31	12	19	†	
Teachers	16	7	9	†	
B (Student Initiated Behavior)					
Experimental	26	2	24	6.20‡	Yes (.05)*
High School	14	1	13	4.22‡	Yes (.05)*
Teachers	7	0	7	3.05‡	No
C (Student-Teacher Interaction)					
Experimental	7	0	7	3.05†	No
High School	4	0	4	2.08†	No
Teachers	5	0	5	2.40†	No
D (Class Interaction)					
Experimental	23	6	17	5.26	Yes (.05)*
High School	14	5	9	1.14	No
Teachers	7	3	4	.14‡	No
E (Method and Material)					
Experimental	19	10	9	†	
High School	11	6	5	†	
Teachers	6	3	3	†	
F (Physical Aspects)					
Experimental	11	0	11	4.36‡	Yes (.05)*
High School	6	0	6	2.72‡	No
Teachers	4	0	4	2.08‡	No

*Significant beyond the 5% level.

†The chi-square for the sub-categories A, C, and E (Table 56) were not significant; therefore, no further analyses were made. ‡Corrected for continuity.

Table 62

Kinds of Critical Incidents Identified as Similar and Dissimilar When Ineffective Televised Instruction and Ineffective Classroom Instruction Were Compared Within Sub-categories A-F in Experimental, High School and Teacher Groups

Group Sub-Category	Incidents	Similar Incidents	Dissimilar Incidents	Chi-Square	Statistically Significant
A (Teacher Initiated Behavior)					
Experimental	64	17	47	14.06	Yes (.001)***
High School	32	13	19	1.12	No
Teachers	12	1	11	6.75‡	Yes (.01)**
B (Student Initiated Behavior)					
Experimental	23	6	17	5.26	Yes (.05)*
High School	14	5	9	1.14	No
Teachers	4	2	2	0	No
C (Student-Teacher Interaction)					
Experimental	8	0	8	†	
High School	4	0	4	†	
Teachers	4	0	4	†	
D (Class Interaction)					
Experimental	28	6	22	9.14	Yes (.01)**
High School	16	5	11	2.24	No
Teachers	7	3	4	.14‡	No
E (Method and Material)					
Experimental	11	2	9	†	
High School	9	2	7	†	
Teachers	3	1	2	†	
F (Physical Aspects)					
Experimental	24	5	19	8.16	Yes (.01)**
High School	13	1	12	3.49‡	No
Teachers	12	1	11	3.04‡	No

*Significant beyond the 5% level.

**Significant beyond the 1% level.

***Significant beyond the .1% level.

†The chi-square for the sub-categories C and E (Table 58) were not significant; therefore, no further analyses were made. ‡Corrected for continuity.

Few significant differences were observed when it was permissible to analyze similarity and dissimilarity of incidents by sub-categories and by groups. When sub-categories were analyzed by groups, the Experimental group had the same three out of four significant differences in both effective and ineffective comparisons; only in sub-category C (Student-Teacher Interaction) was there no significant difference.

Problem 16: Differences in Emphases of Various Teaching-Learning Processes Within Groups

The assumption for this problem was that various rankings of sub-categories denoting teaching-learning processes within a particular group would indicate the **consistency** of their attitudes to these processes under different circumstances. For example, differences in rankings of effective teaching-learning processes between televised and conventional classroom instruction within a group would suggest inconsistency in their attitudes and, therefore, raise questions about the effect of different contexts on presumably a stable attitude.

Are there differences, within groups, in emphases (rankings) of sub-categories (A through F) identified as *effective* and *ineffective* with respect to both *televised* and *classroom* instruction?

a. Within each Medium. Are there differences, *within groups*, in emphases (rankings) of sub-categories (A through F) identified as *effective* and *ineffective* with respect to *conventional classroom* instruction? With respect to *televised* instruction?

b. Between Media. Are there differences, *within groups*, in emphasis (rankings) on sub-categories (A through F) identified as *effective* with respect to *televised* versus *conventional classroom* instruction? As *ineffective* with respect to *televised* versus *classroom* instruction?

Results: Table 63 and 64 include the results of a rank order correlation study of *effective* versus *ineffective* instruction by subject groups.

Table 63

Rank Order Correlations (Sub-Categories A through F) of Effective Instruction versus Ineffective Instruction[1]

Category	College Experimental	College Control	High School Students	Teachers
Effective TV vs. Ineffective TV	.60		.77	.83*
Effective Classroom vs. Ineffective Classroom	.89**	.37	.76	.66

[1] Chi-square tests for independence indicated all comparisons were significant beyond the .1% level except Effective versus Ineffective Classroom, Teacher group, which was not significant.

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*Significant beyond the 5% level.
**Significant beyond the 2% level.

Table 64

Rank Order Correlations (Sub-Categories A through F) of Televised Instruction versus Conventional Classroom Instruction[1]

Cateogry	College Students	High School Students	Teachers
Effective TV vs. Effective Classroom	.03	—.31	—.02
Ineffective TV vs. Ineffective Classroom	—.08	—.18	—.10

[1] Chi-Square tests for independence indicated all comparisons were significant beyond the .1% level.

The Rho correlations within groups and within medium were significant in two instances; in five cases the correlations, though positive, fell short of significance. Nonetheless, the essential issue of consistency of direction was evident, that is, the correlations within groups were positive and, in most instances, were high as well. The picture was reversed when between media comparisons were made of sub-categories by groups. Here, all correlations within groups were around zero and all but one was negative. Again, although the small number of categories ranked (six) made for gross results, the fact remains that the zero order correlations demonstrated major differences in emphases of what constituted effective and ineffective instruction when television and conventional classroom were compared.

Problem 17: Differences between Groups

The same assumptions for Problem 16 obtained here, with an added variable. It was assumed that attitudes towards teaching-learning processes might not only be a function of the contexts in which these processes occurred, but these attitudes were also functions of the characteristics of different groups, High School, Teachers, and College Students.

Are there differences between groups in emphases (rankings) of critical incidents of sub-categories (A through F) identified as *effective* and *ineffective* with respect to both *televised* and *conventional* instruction?

Results: The results appear in Tables 65 through 67.

Table 65

Rank Order Correlations (Sub-Categories A through F) Between Subject Groups

Comparison	Television Effective	Television Ineffective	Classroom Effective	Classroom Ineffective
Experimental vs. Control			.94*	.83*
Experimental vs. Teachers	.88**	1.00***	.83*	.53
Experimental vs. High School	.88**	.94***	.83*	.99***
Control vs. Teachers			.66	.24
Control vs. High School			.77	.79
High School vs. Teachers	1.00***	.94***	.54	.47

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*Significant beyond the 5% level.

**Significant beyond the 2% level.

***Significant beyond the 1% level.

Table 66

Comparison of Groups by Per Cent of Responses in Sub-categories A through U for Effective and Ineffective Televised Instruction

Sub-Category	College Experimental Effective	College Experimental Ineffective	High School Effective	High School Ineffective	Teachers Effective	Teachers Ineffective
Teacher Initiated Behavior	.23	.25	.36	.16	.42	.25
Student Initiated Behavior	.20	.10	.05	.06	.12	.09
Student-Teacher Interaction	.00	.00	.00	.00	.00	.00
Class Interaction	.04	.09	.04	.11	.05	.04
Method and Material	.33	.12	.35	.13	.23	.06
Physical Aspects	.13	.41	.08	.42	.15	.48
Unusable	.07	.03	.12	.12	.03	.08

Table 67

Comparison of Groups by Per Cent of Responses in Sub-categories A through U for Effective and Ineffective Classroom Instruction

Sub-Category	College Experimental Effective	College Experimental Ineffective	College Control Effective	College Control Ineffective	High School Effective	High School Ineffective	Teachers Effective	Teachers Ineffective
Teacher Initiated Behavior	.26	.30	.30	.47	.17	.20	.33	.21
Student Initiated Behavior	.24	.16	.15	.17	.18	.11	.11	.09
Student-Teacher Interaction	.12	.14	.11	.15	.12	.04	.25	.12
Class Interaction	.25	.13	.20	.09	.21	.08	.22	.26
Method and Material	.08	.06	.13	.00	.05	.03	.04	.03
Physical Aspects	.00	.03	.00	.03	.00	.03	.00	.12
Unusuable	.05	.21	.07	.09	.27	.51	.05	.17

The comparison groups were observed to have similarly emphasized sub-categories (A through F) eleven of eighteen times (Table 65). The comparison groups which experienced televised instruction were significantly correlated for each pairing. The picture was not as clear-cut for conventional classroom. Here, only five of eleven coefficients were found to be significant. The lowest relationships observed were the pairings between teachers and the student groups for ineffective experiences in conventional classroom instruction.

Tables 66 and 67 differ from Table 65 in that they present the data in per cent form and allow a comparison of sub-categories. The results are consistent with the correlation study. The differences in per cents of responses among groups (Experimental, Control, Teachers, High School) in each sub-category of each major category were tested for significance. Results appear in Appendix 0. The important results in the latter tables appear to be as follows:

1. Student groups gave similar rankings to the sub-categories with the exception that high school students ranked Teacher Initiated Behavior lower than did college students.
2. All groups ranked Physical Aspects (F) first for Ineffective Television instruction.
3. All groups gave either first or second rank to Teacher Initiated Behavior (A) and Method and Material (F) for Effective Television. If these two sub-categories were combined, an average of sixty-four per cent for all three groups would be obtained. Thus, nearly two-thirds of all Effective Television experiences would deal with either how the teacher behaved or how the teacher manipulated methods and materials.

Summary and Discussion of Area IV

The results indicate quite clearly that, when students and teachers described behavioral incidents which represented effective teaching-learning processes, a wide variety of factors emerged. What constituted effective teaching and learning seemed to be a central issue. Although a common core of experiences were suggested by most of the subjects, there were, apparently, unique experiences operating when effective teaching and learning was considered.

Number and Kind

The number of effective processes for televised instruction was a few more than for conventional classroom, though the difference was not significant. However, the number of processes which described *ineffective classroom* instruction was significantly greater than those describing *ineffective televised* instruction. Several interpretations are possible: (1) Negative factors were more readily perceived by subjects when they were asked to respond to familiar situations. The fact is most subjects in the study had experiences in the classroom for at least twelve years. (2) Televised instruction was novel and the students were part of a research program; these factors may have motivated them to respond more positively than they might have under less unique conditions (Hawthorne effect). If there is substance to this possibility, an hypothesis can be made: With continued, massive experiences with instructional television under operational conditions, positive responses will be reduced. (3) Students are exposed to more stimuli in the classroom and these may interfere with the achievement of their varied purposes. Another issue arises, namely, the presence of a quantitative difference does not imply that each incident or underlying process is equally important to the subject. It may be that, on a quantitative basis, one kind of behavior is equal to X number of other kinds, as far as *value to the person* is concerned. In this context, the larger number of descriptions of ineffective conventional classroom instruction could not be interpreted to mean that, in general, classroom instruction was seen as less effective. Rather, the students may have seen an abundance of possibilities for effective classroom instruction, but these were not carried out. The implication is that conventional classroom instruction may be less constrictive; that is, conventional instruction allows more possibilities for satisfaction and dissatisfaction than does televised instruction. Further, conventional instruction, when not well executed, may create greater frustration than televised instruction.

When both effective and ineffective categories were combined and the number of critical incidents for televised instruction were compared with conventional classroom instruction, the difference in favor of the classroom was significantly greater (beyond the 1% level). These data add support to the notion that televised instruction is seen to be a more constrictive method at the present time, provided the teaching-learning process is defined to be more than acquisition of information.

Another feature of this portion of the study was the examination of the role of Teacher Initiated Behavior (A) in the complex of experiences. It should be noted that one hundred twelve incidents of a total of three hundred five incidents were in sub-category A. Tables 53 (over-all significance) and 54 indicate great attention was given to what the teacher says or does in both television and conventional classroom. If sub-category E (Method and Application of Material) were combined with A, the significance becomes more evident. Thus, the data may be interpreted to imply that the students were more dependent on the teacher than on any other single factor in the teaching-learning process. Another way of looking at these data is to interpret them in the sense that the students evidenced more discomfort in their dependency relations with the teacher in the conventional classroom than in their dependency relations with the teacher via televised instruction.

Emphasis

The statistical results of differences in emphasis support the data for number and kind. Students and teachers were consistent in their descriptions of what constituted effective and ineffective instruction when one medium was involved. However, when the descriptions of effective or ineffective instructional processes were examined for comparisons *between* media, differences emerged. It appears safe to state that, when the context of the teaching-learning situation shifted from conventional to televised instruction, both the teacher and the learner were forced to depend on different aspects of the same complex of processes. Whether one part of the complex was better than another seemed to be irrelavent, largely because the context demanded the emphasis of different processes. An explanation is now suggested as to why no differences in performances have occurred in many studies of televised versus conventional instruction. For example, in the conventional discussion oriented classroom, there is probably less opportunity for tight organization and presentation of material on the part of the instructor. Consequently, there probably is greater emphasis on getting students to interact, to interpret information, to question the sequence of ideas, and to confirm the understanding of the material. However, when the instructor is in a situation where there is little or no opportunity for feedback systems, he and the students are forced to rely on the instructor's organization and presentation of material.

A paradox results from the design of the teaching-learning process that limits instructional practice to tightly organized, pre-packaged learning material. On the one hand, the teacher is allowed a great degree of freedom to explore creatively in his field; he is forced to explicate complex theories and ideas to achieve maximum clarity and understanding in the minds of the learners. On the other hand, the student may be restricted in the number of ways he may creatively organize the material for himself. The exciting aspects of learning, namely, the discovery of relationships, the resolution of dilemmas, and the search for causes, becomes more the property of the teacher than of the learner. The teacher is seen as effective to the extent he communicates this excitement and clarifies ambiguities for the learner. This assertion appears to be supported by the data in Table 67. Shared discovery or exploration (Class Interaction—D) was ranked high by all students in Effective Classroom Instruction, but was not rated as high in Ineffective Classroom Instruction. The teachers, however, differed from the students. Although the teachers gave a similar emphasis to Classroom Interaction for Effective Classroom, they gave a significantly different emphasis for Ineffective Classroom Instruction. An interpretation of these data is that the teachers were faced with the problem of how to direct the learner group so that they, the teachers, could achieve one of their goals, namely, the communication of their insights and information. These data may help to explain the dissatisfaction expressed by some discussion leaders, particularly those who led television groups. These faculty discussion leaders may have been doubly "blocked"; the nature of their discussion assignment reduced their traditional role of transmitters of content to students and, further, what was left of the role was assigned largely to the television instructor.

Differences Between Groups

Major similarities appeared when the experiences of college students were compared with those of high school students. An exception was observed in the comparison of Effective Classroom Instruction. Rankings of Teacher Initiated Behavior (A) and Class Interaction (D) show the college students (Control and Experimental) placed Teacher Initiated Behavior in the highest rank and Class Interaction second. The high school students placed Class Interaction first and Teacher Initiated Behavior third. The college students were mostly freshmen, recent high school graduates. One possible explanation for this difference in rankings is that college freshmen may experience a temporary shift from some form of independence from teacher authority as high school seniors to a transitional dependence when they enter the college culture as lowly freshmen. Possibly, their shift from seniors of high status to freshmen of low status, combined with the aura that surrounds college professors, temporarily altered the balance of the dependence-independence continuum. This point must remain speculative because there are here no data by which college upper-classmen can be compared with lower-classmen.

When students were compared with teachers in their descriptions of effective and ineffective instruction in both media, similarities were seen. Correlation coefficients between groups for Effective Television Instruction ranged from .88 to 1.00, and for Ineffective Television, coefficients ranged from .94 to 1.00. All were significant beyond the five per cent level. Coefficients for Effective Classroom ranged from a low of .54 to a high of .94; corresponding ranges for Ineffective Classroom Instruction were from .24 to .99.

A cultural stereotype may exist as to what constitutes effective and ineffective instruction. Although some variation in emphasis occurred and variability of kinds of behavior in different contexts were demonstrated, nevertheless there was sufficiently strong agreement among the three groups to indicate that the groups perceived much the same processes and valued them in the same direction. If this is true, it would be difficult to predict gross differential effects occurring in any variation of the teaching-learning process where the major parts of the process were kept intact, that is, the ways the process were experienced in this study, and were given the same value. For example, the teacher was seen by all groups to play a primary role, positively and negatively, in the teaching-learning process. But what would occur to student achievement and attitudinal set in a situation in which the teacher was nonexistent or was not perceived in the teacher role? Whatever would result would be due to a fundamental variation of the teaching-learning process.

In summary, the major findings of this portion of the study seem to be the following:

1. All three subject groups agreed on a common core of what constituted effective and ineffective instruction. This suggests that a cultural stereotype existed for the teaching-learning process.
2. The variability of kinds of incidents indicated that individual differences in perception and emphasis existed. This implies that any particular teaching-learning process may be useful as long as it satisfies the purposes and needs of the individual.
3. A significantly larger number of different kinds of critical incidents occurred in conventional classroom instruction than in televised instruction when both effective and ineffective processes were combined. This suggested that, for large groups, televised instruction at this time was more constrictive than conventional classroom instruction. In time, students may learn new ways of compensating for some of television's present constrictions.
4. Students seemed to be quite dependent upon what the teacher said or did. However, they reacted negatively to this dependency relationship more in the classroom than they did in televised instruction. Other data in this report may imply that Television at Home fostered less dependence than Television on Campus.
5. Particular teaching-learning processes were given differentially greater emphasis in value according to the context in which the process occurred. Thus, for example, in televised instruction, teacher organization of material and application of method were given high value. However, for the same people, class interaction and other indexes of student participation were given higher value in conventional classroom instruction. This suggested that student attitude toward teaching and learning function flexibly in different learning contexts.

Area V: Administration, Production, Cost Analysis

The three topics considered in this part of the study are administration, production-direction, and cost analysis. Although these topics were secondary to the main objective of collecting and evaluating data, the first two assisted in making televised instruction possible, while the third was a requirement in the prospectus and is of interest to those who must find methods to finance instruction.

Administration of Project II

Administrative organization was required to do three tasks of the Project. These were: (1) to arrange for students, space, and equipment; (2) to coordinate the several aspects of the Project; and (3) to collect and evaluate data about televised instruction. How the Project Office was organized to accomplish the three jobs should be of interest to those who must plan the implementation of televised instruction. However, the procedures devised at San Francisco State College should not be seen as models to be copied elsewhere. Rather, the machinery should be studied for the assistance that may result in understanding and anticipating the kinds of problems associated with televised instruction. Hopefully, some possible paths to resolution of local problems may be suggested by a consideration of Project II administration.

Staff

The staff of Television Research Project II was selected by the president in consultation with other administrative officers of the college. Staff assigned to the Project Office for the period of the grant and the amount of time allotted to each follows:

Position	Time Assigned to the Project Spring 1957	Summer 1957	Fall 1957	Spring 1958	Summer 1958
Project Director	1/4	6 weeks	1/2	1/2	11 weeks
Project Evaluator	—	6 weeks	1/2	1/2	11 weeks
Area IV Evaluator	—	—	—	1/4	4 weeks
Production Director	1/4	6 weeks	F.T.	3/4	7 weeks
Visual Coordinator	1/2	—	—	—	—
Administrative Coordinator[1]	—	—	1/4	1/4	—
Office Manager	F.T.	F.T.	F.T.	F.T.	F.T.
Secretary	—	—	F.T.	F.T.	F.T.
Course Coordinators, Science 10 and 11	—	—	1/6	1/6	—

In addition to the above, a large number of college faculty and staff assisted the Project in the accomplishment of its work without any released time.

Organization

Figure 1 portrays the lines of responsibility and the relation of the Project to the College and The Fund for the Advancement of Education. The figure shows that the Project was organized as a separate body which reported directly to the chief administrators of the College. Further, the figure makes clear that the responsibilities of the Project were limited to research, evaluation, and production. However, in order to function, the Project had to relate to practically every administratively recognized group on campus, and to several agencies off campus. It was in the relationship areas that most problems arose.

Functions

The principal functions of the Project Office can be grouped under four headings: (1) Research; (2) Off Campus Contacts; (3) Fiscal Organization and Budgets; and (4) Production.

Research. Research rightfully occupied the major attention of the Evaluator, Area IV Evaluator, and Director. Although the over-all design was outlined before any of those responsible for its execution were assigned to the Project, the design was improved and specific research problems and methods were delineated. Evaluation instruments were prepared; and classrooms were arranged for mass testing. Subjects, most of whom were entering freshmen, were reached by mail, assigned to sections, pretested, and preregistered in all courses. Along with the pretesting of the college students, a pretesting program was conducted in seven high schools and in a state prison. Posttesting was complicated by tight room space and by the necessity for final examinations to be held at specified times and places. The whole procedure was repeated for the second semester. Further, the decision was made to have the Service Bureau of International Business Machines do the burden of the statistical computations. The time spent in explaining the Project, the design and techniques, and in writing contracts was more than repaid in time saved, particularly for the second semester. In addition, the Director and Evaluator selected, trained, and supervised students who worked as research assistants. Finally, there was the preparation of the report.

Off Campus Contacts. The Project's contacts extended beyond the confines of the College. The fact that the courses were open-circuit accounted for many, but not all, of the off campus activities. Among the contacts were the public high schools, Station KQED, San Quentin Prison, visitors, extension students, and casual viewers. Space does not permit the discussion of all these contacts. Only three, KQED, the high schools, and visitors will be mentioned.

Contacts with Station KQED occurred daily because all programs were aired from KQED's studios. In addition to these daily contacts, conferences were necessary from time to time to deal with contracts, schedules, remote telecasts, and public relations.

The College found in KQED an organization with educational goals similar to its own in that both wanted sound instruction accompanied by high quality production. Nonetheless, successful presentation of the courses required full cooperation. Although the programs were produced and directed by college personnel, all required KQED technical staff. Experience with KQED indicates that a college can effect liaison with an educational television station and retain responsibility for and direction of the instructional aspects of its courses.

The research conducted in conjunction with the high schools was a major enterprise by itself; yet, it was subordinate to the on campus project. About three hundred fifty students in eight high schools were involved in the study for the Spring Semester 1958. All the schools were in San Francisco. Other institutions were interested in participating, but it was not possible to serve any additional schools with the funds and staff available.

Coordination between the high schools and the College was effected at three levels: (1) liaison was continuous with the Office of Associate Superintendent for Senior High Schools; (2) direct contact was made with curriculum coordinators, department heads, head counselors, or some person designated as coordinator at each school; (3) participating high school teachers were met either in their schools or at the College, where most attended seminars for the high school teachers participating in the experiment. Seminars were organized through the Extension Division of the College, and participating teachers were encouraged to enroll for credit with tuition paid by the Project.

A seminar was held for each of the four courses offered to high school students, two in the fall and two in the spring. The seminars served several purposes in addition to administrative coordination. Seminars allowed for direct and indirect feedback from high school teachers and students; instructors could answer the questions of teachers and students; the sequence of course content could be

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[1] Time not charged to the Project.

ADMINISTRATIVE ORGANIZATION
Television Research Project II

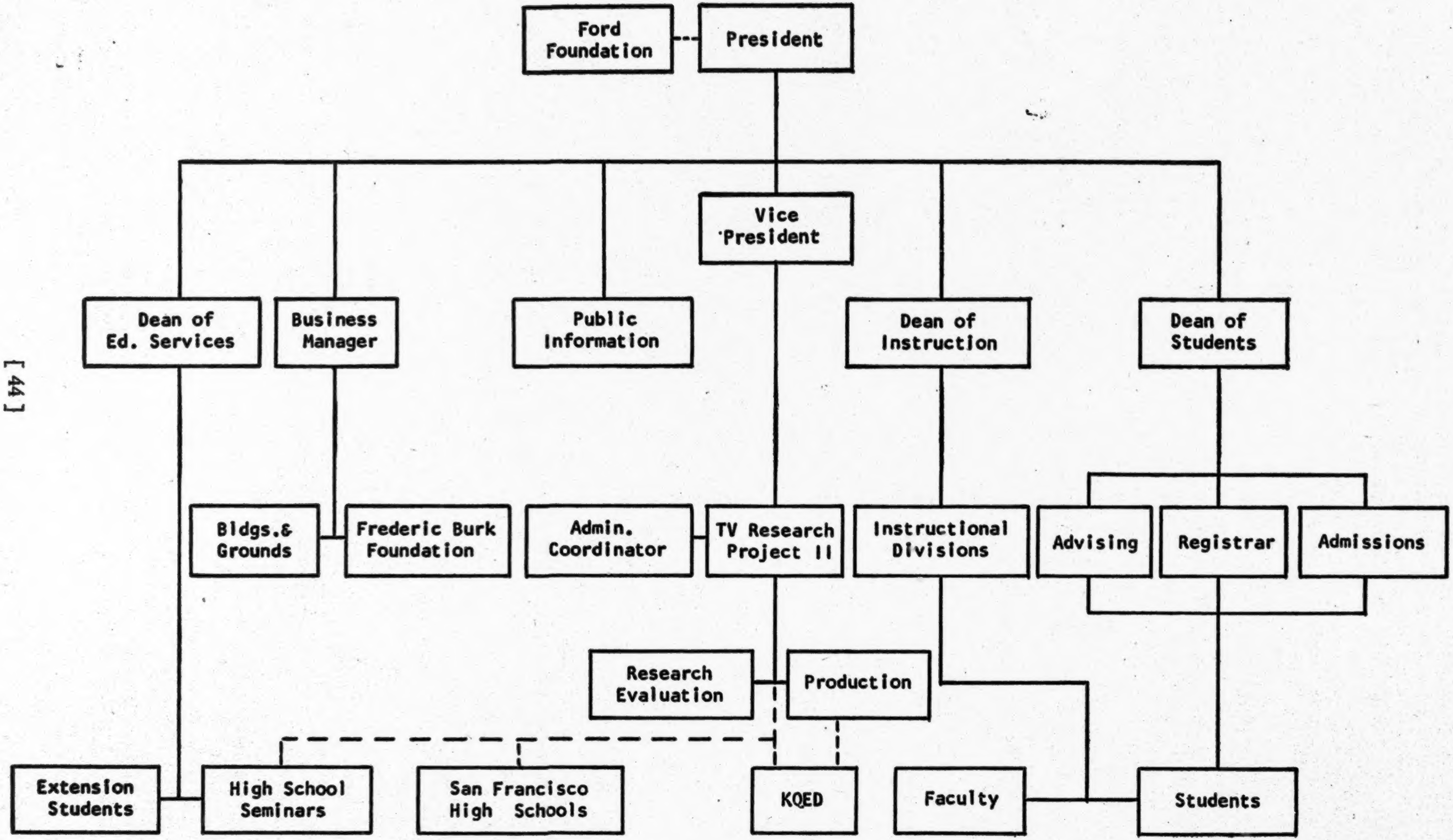
Ford Foundation
President
Vice President
Dean of Ed. Services
Business Manager
Public Information
Dean of Instruction
Dean of Students
Bldgs.& Grounds
Frederic Burk Foundation
Admin. Coordinator
TV Research Project II
Instructional Divisions
Advising
Registrar
Admissions
Research Evaluation
Production
Extension Students
High School Seminars
San Francisco High Schools
KQED
Faculty
Students

FIGURE 1

SELMA BURGESS

coordinated; and the seminars provided in-service training for the high school teachers. Despite these various levels of contact, the tasks of pre- and posttesting, collecting and scoring compositions, mid-terms and finals, distributing texts, syllabi, and course materials, arranging for library services, and handling miscellaneous problems, e.g., television receivers, severely taxed the Project Office.

A stimulating, but nevertheless time consuming responsibility, was the hosting of visiting personnel. The Project had attracted wide attention and was geographically accessible. Visitors came from distant parts of the continent or from across the seas and their visits varied from a few minutes to entire days. Related to this host function was the speaker function. Project personnel were requested to describe the experiment and its progress before various professional and semi-professional groups. The combination of these two functions meant that there were few weeks without a visit or a speaking engagement.

Fiscal Organization and Budgets. The grant for the study was made to the Frederic Burk Foundation for Education, a non-profit educational foundation incorporated at the College. The Foundation was charged with holding and disbursing all funds. This service of the Foundation reduced and simplified the amount of fiscal work done by the Project Office.

The grant was divided into a number of account titles, e.g., salaries and wages, production; the status of each was reported monthly by the Foundation in terms of budgeted allotment, cumulative expenditures, and unexpended balance. In this way, close control of the budget was possible. As the study progressed, some internal changes were made within the budget; the principal change was the provision of salaries for the Project Director and Evaluators for summer session 1958. The budget that follows is the one that appeared in the Prospectus and provides some notion of the account titles and the amount of money in each.

Television Research Project II Budget

Covering Period from February, 1957-September 1, 1958

1. DIRECTION AND PRODUCTION — COMBINED PROJECTS

A. Salaries and Wages		
Project Director (½ time regular academic year 1957-58 and summer session 1957)	$ 5160	
Evaluation Director (½ time regular academic year 1957-58 and summer session 1957)	4578	
Production Director (½ time spring semester 1957, academic year 1957-58, 3 wks. summer session 1957 for preparation)	5917	
Visual Coordinator (½ time spring semester 1957 and academic year 1957-58)	6084	
Production Assistance (Graduate assistant responsibility for each of five courses—basis $750 fellowship)	3750	
Clerical Assistance — One Senior Steno-Clerk, full time. 2/1/57 to 9/1/58. One Intermediate Steno-Clerk, full time 7/1/57 to 9/1/58	10439	
Evaluation Assistance (Statistical clerks, evaluation specialists, calculator operators, etc.)	4500	
		40,428
B. Operating Expenses		
Printing and duplicating (course syllabi, supplemental materials, statements, final reports on science project)	4600	
Administrative and Office Supplies	1200	
General Expense (telephone, telegraph, postage, equipment, rentals, etc.)	2100	
Travel and Expenses, staff	1650	
Retirement and Sick Leave Offsets	4625	
Contingency Fund (both projects)	11000	
		25,175

II. SPECIAL STAFF, OPERATIONAL & PRODUCTION COSTS

A. Continuation of Present Project		
(1) Teaching Staff Course Preparation and Organization — one instructor ½ time one semester only and summer session 1957.	$ 2739	
(2) Student Assistance Organization of material, proctoring, assistance with presentation, examinations, etc.	1750	
(3) Television Program Materials Preparation, purchase and rental of art work, film materials, slides, photographs, etc. Assumes substantial portion of first year's materials will be available for second year without additional cost; amount is one-half first year's budget.	3900	
		8,389
B. Science Project		
(1) Teaching Staff Course Preparation and organization —one-third time for three faculty in spring and fall semesters 1957; summer session 1957.	10056	
Instructional—one-fourth time for three faculty in fall and sping 1957-58 for teaching course; State to assume cost of remaining ¾ time.	5517	
(2) Student Assistance Organization of material, proctoring, assistance with presentation, examinations, etc.	3750	
(3) Television Program Materials Preparation, purchase and rental of art work, film materials, slides, photographs, demonstration items, etc.	9500	
(4) Special testing and evaluation records and forms, questionnaires, evaluation records, etc.	750	
		29,573

III. STATION KQED FOR ENGINEERING AND PRODUCTION

A. Continuation of Present Project Operating costs (includes studio rehearsal, air time, engineering, direction, etc., salaries-services.) Excludes costs of sets, properties, etc., carried over from first year and less production costs than first year.	$41000	
B. Science Project Operating costs (includes studio rehearsal, air time, engineering, direction, production, etc., salaries-services.)	36000	
Kinescope recording—6 programs for experimentation and evaluation purposes.	2400	
		79,400

IV. PROGRAM FOR SUPERIOR HIGH SCHOOL SENIORS

A. Teachers for high school discussion sessions. Assumes participation 4-6 Bay Area School Districts.	$ 6500	
B. Operating Expenses. Course materials, texts, charts, syllabi, etc.	2500	
		9,000
TOTAL ALL PROGRAMS		$191,965

Production and Direction of the Televised Courses

The Producer-Director for the Project was a regular faculty member of the Radio and Television Department of the College. All phases of production, with one exception, were under the direction of the Producer-Director. The exception was that all purchases made by the Production Office in excess of twenty-five dollars were processed through the Project Office.

The description of production-direction responsibilities, as perceived by the Producer-Director of the Project, follow.

General

The technical and production elements of the San Francisco State College television experiment probably were unique in instructional television. Telecasts were open-circuit, originated in the studios of KQED (Bay Area Educational Television Association), and were produced and directed by the faculty and students of the College. Televised courses were viewed not only by college, high school, and extension students, but were available to a wide audience not participating in the experiment.

The airing of telecasts was a shared responsibility of the College and KQED. Production of the programs, including on-the-air direction, was the responsibility of the College as represented by the Producer-Director and his student staff. KQED engineering personnel managed all technical functions, including camera work, lighting, switching, and audio. This shared arrangement had several advantages: (1) It allowed a maximum of college control over the production and direction of its instructional programs, within station and Federal Communication Commission policies and regulations; (2) It provided training opportunities for students in radio and television curricula; (3) It avoided capital outlay for space and equipment; and (4) It relieved the College of hiring technicians and engineers.

Staff and Equipment

College Staff. The production-direction staff was headed by a full-time faculty member from the Radio and Television Department. He was assisted by a production office group which consisted of a half-time secretary, full-time graphic artist, and production assistants. The latter booked and edited films, located specified audio-visual materials, and handled some office details. Each course had a student floor crew of three or more members to handle usual studio duties: floor manager, camera cable pullers, prop men, and visual and special effects men. The floor crews also dressed the sets and struck them at the conclusion of the telecasts. A few selected graduate students actually produced and directed entire telecasts. Student assistants were either paid (fellowship or hourly rate student assistance) or enrolled for credit in regular college television training courses.

KQED Staff. To air KQED's full program schedule, ten technicians are employed by the Station. Not all were required for the college's televised courses; the number necessary for a program varied with the complexity of the production. The usual complement of engineering personnel assigned by the station to handle the bulk of the college production was four: two cameramen, who lit the set, an audio man; and a technical director, who handled switching duties. A microphone boom operator and a man to handle special lighting effects were added when the complexity of the production so indicated.

Technical Equipment and Studio. The College relied entirely upon the facilities of KQED except for some items of audio-visual equipment owned by the College. The Station owns commercial broadcast quality equipment; cameras are image orthicon type. Replacement costs for KQED's studio (60′ x 60′) and equipment, less transmitter, are estimated at $200,000.

Instruction

Although the instructors selected to teach the televised courses approached the medium with varying degrees of confidence, almost all found the initial impact of television to be disquieting. It was moderately upsetting, not quite what had been expected, and very different from a classroom. Suddenly, new elements were superimposed on the teaching function. Besides instructing, the teacher had to be concerned with the cameras, maintain eye contact with now one lens, and now another, and follow the cues of the floor manager. He had to be aware of his own verbal cues to the director so that certain pictures, slides, film clips, or charts would appear on the viewer's screen at the right time; he was required to pace his material to a rigid time schedule. There were the distractions of lights, the subdued, yet audible talking by the crewmen and cameramen to the director on a studio-control room telephone intercom line (inaudible on the air, but quite clearly heard in the studio), the movements of people and cameras. Amid all this, the instructor was told "act natural—be yourself." Little wonder the instructor's first experience before live cameras was more or less upsetting.

Orientation to Television Instruction. Several steps were taken by the Producer-Director to initiate the new instructors to television. A conference between the new instructor and the Producer-Director was held to orient the instructor to television. In this meeting the technicalities of production were covered. Included were: the function of the cameras and lenses, switching of shots, the work of the director, and the limitations of the medium. The assumption was that, if the new teacher understood some technicalities, he was more likely to understand how to handle himself on camera and why he had to observe certain studio rules, which to the uninitiated might appear capricious and arbitrary. The preliminary meeting was followed by a series of conferences in which the instructor outlined his conception of the course, its content, and sequence. Together, the instructor and Producer-Director made detailed plans for the first few telecasts and prepared for rehearsals.

The initial trying experience before the cameras was anticipated. Therefore, a few days before the actual telecast, a full, closed-circuit dress rehearsal under actual broadcast conditions was arranged. When possible, there were two dry-runs for each instructor. These pre-debut rehearsals were important because expertness and ease before the camera is, in a large degree, a matter of experience. After each rehearsal, frank evaluation was made of the instructor's behavior on-camera. By the third on-camera appearance, usually the first actual telecast, most of Project II instructors demonstrated marked improvement over maiden efforts. Some instructors, with particular instructional methods, adapted quickly to the new demands of televised teaching. On the whole, the over-all performance of these relatively inexperienced (one exception) television instructors was remarkably accomplished.[1]

Script versus Non-Script. The method of delivery varied almost as widely as the number of instructors. Most worked from an outline. However, the outline of one instructor averaged a sparse six or eight entries while another's covered two typewritten pages. One instructor began his television series using pages of detailed typewritten notes which gradually dwindled in number as his confidence and ease in front of the cameras increased. Some instructors used fully written-out scripts exclusively. One worked entirely without notes. Another wrote some of his lectures and gave others from an outline. This variety of approaches underscores the point of view that the Producer-Director should conform to the technique that is most natural and comfortable to the instructor.

One phenomenon of teaching by television felt strongly by some instructors was the necessity of organizing lecture material carefully so that it moved along at a brisker pace than seemed necessary in a conventional classroom. One of the instructors, somewhat shaken after his first dry-run on-camera, said he sensed that he had been "boring the camera." He dropped some of the anecdotal material he had planned and moved directly into the course material.

There appears to be a lower threshhold of boredom in television than there is in a conventional class. Perhaps the student in the conventional class has, over a period of time, devised defenses to handle boredom; as yet he may not have learned compensating techniques for televised instruction. Apparently, the academic pace of the lecture material must perforce be brisker. At least many of the instructors felt this to be so, and they spent much more time organizing their material for television teaching than for classroom lectures.

Instructor-Producer-Director Relationship

The relationship between the instructor and the Producer-Director was important to the instruction as viewed by the student. From the outset the Producer-Director made his own role conform to the fact that the instructor *was* the program, that the course content was his exclusive province and that the success of the series depended ultimately on the instructor himself—on his excellence as a teacher. The Producer-Director was there to explain the medium to the instructor, to acquaint him with its possibilities, and to suggest possible production devices that were likely to enhance the instructor's presentation. However, the devices had to be judged on how well they applied to, and advanced understanding of, the course content in light of the instructor's individual approach to teaching and television. Thus, the content of every telecast was, in reality, instructor controlled.

Much of the burden of making the television medium congenial to the classroom teacher rests with the Producer-Director. A conflict between the instructor and the Producer-Director, with strong, unbending ideas about what makes good television teaching, could make the experience unpleasant for the instructor. Perhaps under such conditions, potentially excellent television instructors might never reach their full effectiveness.

Production

Overproduction, production for production's sake, is a temptation to a director in television. The cameras are versatile; the medium is full of possible dramatic visual "gimmicks." It is not hard to get carried away. The competent instructional television director should have the taste and sense to ignore those production techniques, no matter how dramatic or visually handsome, that are not precisely applicable to the course material itself, or that are not consistent with the instructor's teaching procedures.

A bias among some members of the teaching profession against television as an academic tool stems from the "show" aura that surrounds the medium. Since entertainment is its usual product, this bias is not unexpected. The Producer-Director who works in instructional television and who succumbs to the temptation of filling telesessions with production tricks that get in the way of the course material, helps to spread the bias that television is somehow frivolous. This does not mean that genuine showmanship, that is teaching and production aimed at making the course material as interesting and stimulating as possible, should be left out of instructional television. Dullness is no more effective on television than it is in the conventional classroom; in fact, it may be worse.

No hard and fast rules about what makes a first-rate television presentation could be observed from the variety of effective instructional approaches used in the six televised courses. There were excellent lectures that involved nothing more visual than a blackboard. However, the television camera's ability to enlarge a blackboard entry, to select and show only what applies at the moment, made the blackboard a visual tool of somewhat greater variety than is usual. Other televised lectures, also excellent, made use of a variety of visual aids: a large rear-projection screen on which important words, charts, and pictures appeared; magnet board material; pictures from various texts; and drawings and graphs by the staff graphic artist. Occasionally, a vignette, dramatized by student actors, was made part of a telecast. On the Creative Arts course telecasts, dramatic excerpts were common because the course, in part, dealt with drama itself.

The instructor on the Basic Communications telecourse employed the discussion method, using three hand-picked students along with occasional guests: a local novelist and critic, a poet of the "San Francisco School," a psychiatrist with a strong interest in literature, and a group of jazz musicians who illustrated improvisation as against strictly formal artistic methods.

The discussion method of instruction adapted itself satisfactorily to television as long as the instructor made the viewers part of the discussion circle by periodically addressing them directly. This was accomplished through the simple expedient of making eye contact with the camera lens. Without this, the director felt the student viewers would tend to feel excluded from any active, personal participation in the discussion, and would lose interest in it. Educational television depends on the eye contact of instructor with viewer to create any sense of intimate personal exchange. Properly used, the medium does possess this quality, but only if the camera represents for the instructor

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[1] The Producer-Director's independent conclusion was supported by the studies of Attitude to Instructor.

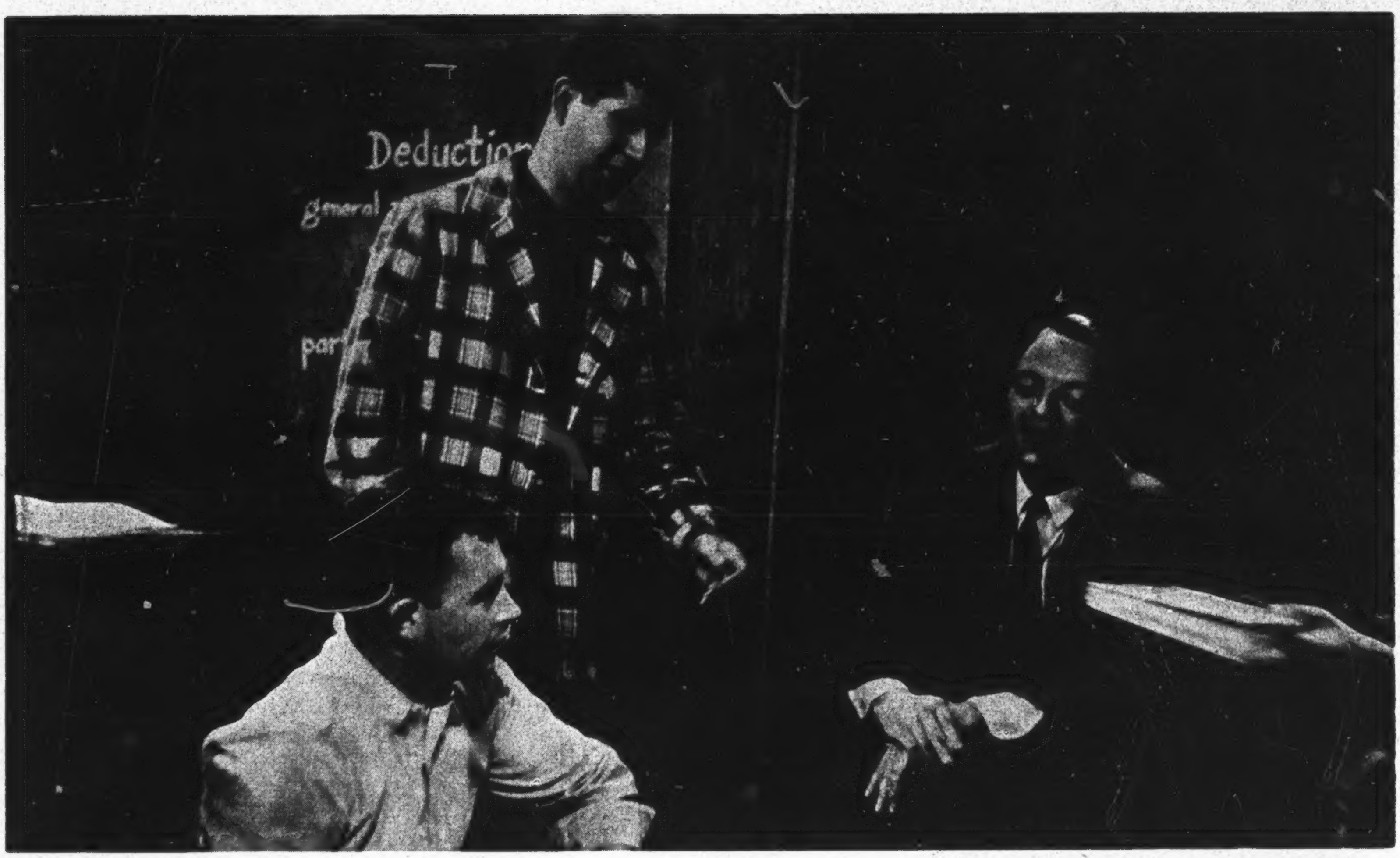

Figure 2. Student production crew and English 6.1 professsor making final preparations minutes before going on the air.

a direct, personal, open passage to his students, and not a cold, impersonal electronic gadget. Improperly used, television can be a barrier to student contact rather than a means to it.

Some instructors missed the interaction between themselves and their students, and felt they were, therefore, less effective. Others preferred to address themselves only to the camera. A question remains whether, as a general rule, the inclusion of students in the studio makes instruction less effective for the television student. A great deal depends on the particular instructor, in-studio students, and the effectiveness of their exchanges. Further, some instructors may have an implicit conception of the instructional process that requires some interdependence of student and instructor in order to be effective, while another may conceive of the instructional process as mainly a teacher dominated function. Thus, the former instructor may need and effectively use a proxy class and the latter may function effectively without a studio class present. Finally, the nature of the content and the goals of the course may well be other contributing factors.

The use of dramatics to illustrate formal course material was a technique that was employed with extreme care because drama must be produced expertly, no matter how brief. The acting, the dramatic material, and the production must be first-rate to be effective. The fact is that the technical and production standards which the student viewer expects of instructional television are set, to a great extent, by what he sees on commercial television. This does not mean that the student expects lavish and complicated productions, but he should be seen as expecting a comparable level of competence in the acting, camera work, direction, and lighting.

Visuals

The generalization that visuals are a must to teach effectively on television is not wholly true. A good straight lecture on television is still a good straight lecture. Nevertheless, because television does have the power to picture, and to picture with selectivity and precision, the orientation of instructor and producer should be for effective visualization of the course material. However, both must be on guard against the visual that lacks relevance. An irrelevant visual is worse than no visual at all. Furthermore, this question must be kept in mind: Is the goal to teach, or is it to exploit the visual possibilities of the television medium? If the aim is to teach, then the eduçator and producer should view instructional television for what it is: a new tool, with a wide range of application, and not an exercise in picture making.

Some courses lent themselves readily to visualization. The Life Science course (Science 11) was one of these. The subject matter needed to be seen to be explained. Visuals such as slides of cellular structure, a specimen of a human brain, extreme close-ups of particular insects, the skeletal organization of animals and humans, were essential elements of the course material and were well adapted to television. Television's ability to magnify was used to great advantage in this course. A memorable magnification was the close-up

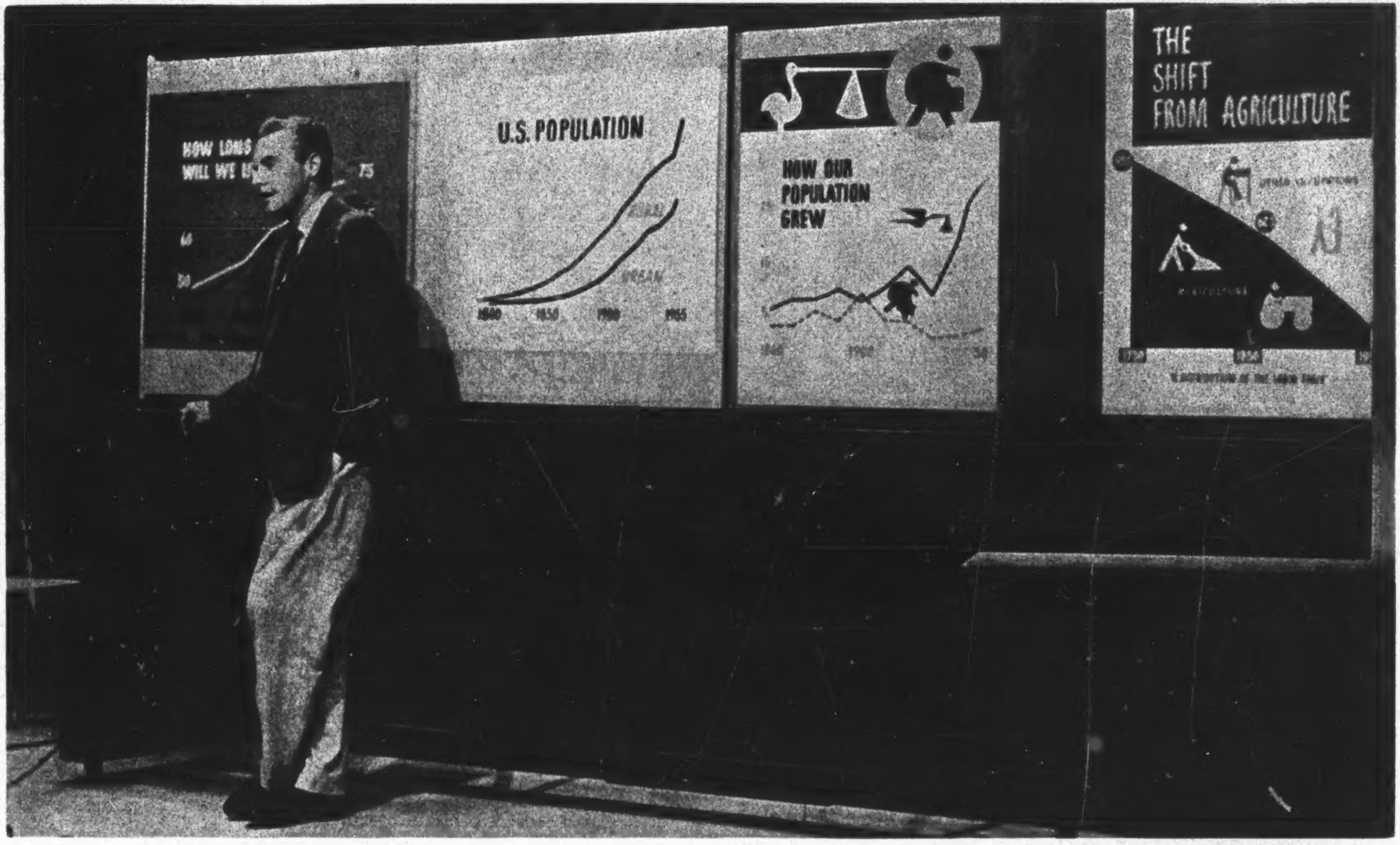

Photo by Orv Goldner

Figure 3. Examples of visuals used in Social Science 30, The American Economy.

of the oviduct of a laying hen; as seen by the viewers, the immature eggs nearly filled the television screen illustrating with remarkable clarity the instructor's explanation.

One of the courses with a seemingly limited visualization potential was Psychology 10.1, The Psychology of Personal and Social Adjustment. However, because the instructor was interested in exploring the possibilities of the medium, while at the same time insisting along with the Producer-Director that a production device be workable, relatively foolproof, and effective in the teaching of course material, the "non-visual" course was effectively pictorialized. Photographs, paintings, graphs, charts, motion pictures, occasional live dramatic vignettes, magnet board entries, plus a selective use of music, were all employed to add visual and aural pace and interest. The impact of pictures, graphs, and lecture outline material was heightened when the material was thrown on a large rear projection screen that formed a backdrop for the instructor.

One of the most interesting and challenging of the programs of Psychology 10.1 was a remote telecast direct from a cell block in the state prison at San Quentin, California. Nine inmates, all taking the televised course as part of the Extension program of San Francisco State College, were interviewed by the instructor in an attempt to explore the bases for their adjustment, social and personal, especially in the light of the course material This program was instructional television at a high level, and illustrates what television can do in the way of truly original instruction. Required is a production budget the size of the one provided for Project II. Furthermore, it is extremely rare in instructional television, at present, to find a combination of technical facilities, a budget, and the trained personnel at the station and the College that make such an ambitious production possible.

Graphic Art

The graphic artist played an important part in the Project. All of the instructors made use of skillfully executed graphs, charts, drawings, and letterings. Some used the service to a considerable degree.

The graphic artist learned to stay away from color, and created visuals in the varying shades of the gray scale. Color rendition is still such an unprecise matter on black and white television that the way to make certain a chart will be reproduced with the proper contrast on television is to stay in the gray scale.

At first there was a tendency to put too much material on a chart for satisfactory readability. As a rule, the best impact was achieved with a few big words and simple format.

The basic guide to the shape of television artwork is the shape of the television screen. The formula for size is a ratio of three high by four wide This same formula was used as a guide to instructors when they made entries on a blackboard.

Settings

Settings, as with the other facets of studio production, are important in television because they have an effect on the attention of the viewer. Although the set used in Psychology 10.1 was serviceable enough, it had some distracting qualities: an annoying line formed by the chalk trough bisected the head of the instructor when he sat at his desk; a cheap backboard made an unpleasantly smudgy, flat background for the instructor. To solve the latter problem, the cameras had to work at a sharp angle to the instructor. These seemingly small inconveniences may distract the viewer.

One of the more effective settings, that for the Science 10 course, was one of the simplest. The background was simply darkness, relieved only by the big rear projection screen that showed pictures of stars, planets, constellations, and other visuals as necessary. The dark background, with the changeable stellar pictures, were especially appropriate to the course material. There were no distracting lines or patterns to divert attention from the instructor beyond the space photographs which were themselves course material. A large, boomerang-shaped desk and a stand-up "writing unit," a structure that held large disposable pieces of gray paper on which the instructor wrote or diagrammed in charcoal, completed the setting. The idea of disposable paper eliminated the smearing (smudges are accentuated by the cameras) that occurs on a blackboard after several erasures.

Another setting, effectively used for the English course, was a contemporary lounge or sitting room that incorporated the rear projection screen along with various levels at which the instructor could stand or sit. It was well suited to this discussion type of course. Although the set was complex, it possessed unity and did not conflict with the participants for the viewer's attention.

Direction

The Producer-Director encouraged and was available for regular office conferences with the instructors to talk through each telesession. Conferences varied from a quick phone call to check on a needed visual to a scheduled two-hour discussion and planning period. Planning was regular and extensive at the start of each course. Some instructors, as they learned the mechanics of television, planned each lecture and the accompanying visuals *entoto*. An hour before going on they talked through with the Producer-Director what they were going to do. This technique, while not recommended, can work well with a trained instructor and an adaptable director. The latter must be adept at calling an "ad-lib" show, that is, at creating camera shots on the spur of the moment as the telecast progresses.

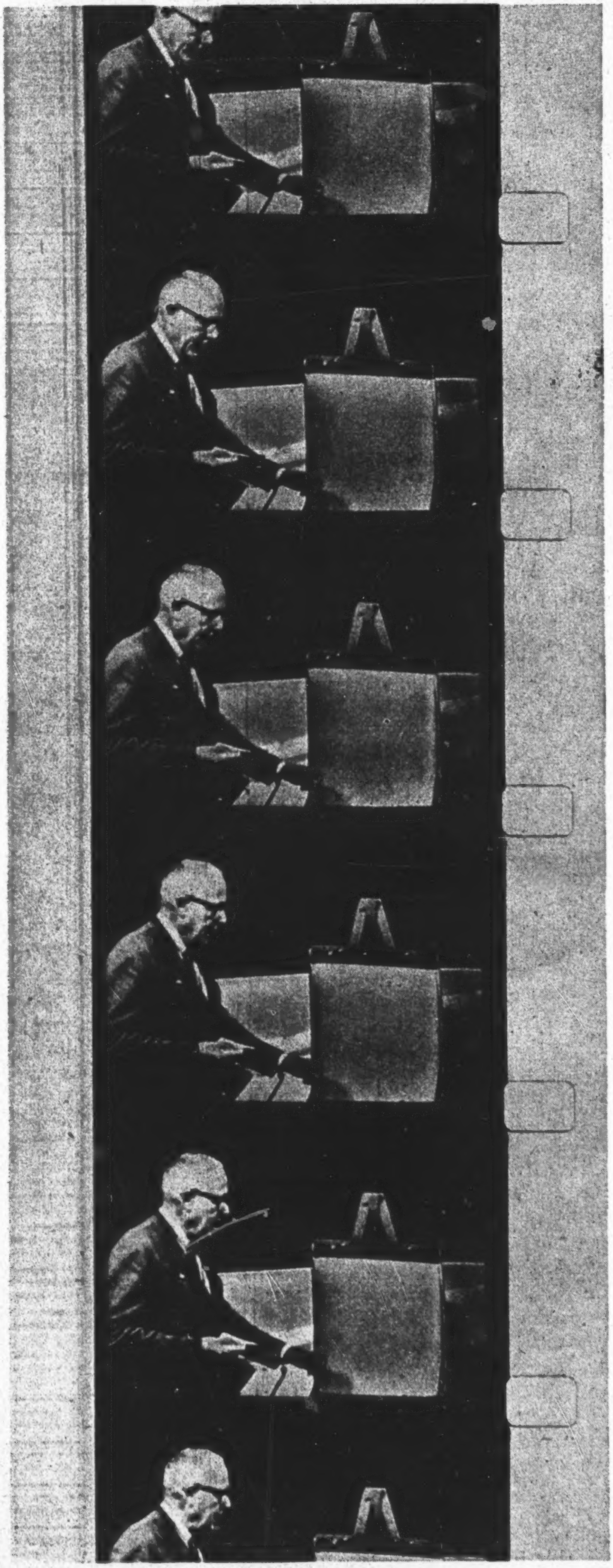

Figure 4.

A few frames taken from a kinescope of one of the Science 10 telecasts.

Kinescope Arrangements by Orv Goldner-Mike Blas

Apropos of this, even in the most carefully planned telesessions, shots were still called more or less "ad-lib" by the director in that every shot was not decided on and written out beforehand.

The contract between the College and KQED specified fifteen minutes of studio rehearsal time. How this time was used depended on the elements of the individual production. "Rehearsal," after the first dry-runs, seldom meant running through the full lecture itself. The time was used to check the shots on the several visuals involved: a close-up of a mounted specimen, a picture or diagram in a book, a rear-projection effect, the rehearsal and shooting of a dramatic insert, or a special lighting effect.

Some of the sessions in Creative Arts, usually the drama sections, were fully scripted, and the shots and camera movements carefully mapped. This was essential to multi-scened productions where a series of split-second cues for changes of locale and acting personnel occurred. In these productions the student Assistant Director fulfilled his real function: he cleared cameras early to new scenes, set up the oncoming shot, and gave the "ready" commands to the cameramen.

Production Costs

The actual production cost of televised college teaching is difficult to estimate. On the one hand, certain factors are easy to determine, for example, the cost of using a facility such as KQED; on the other hand, some costs, for example, student or faculty talent, are relative. The production budget was adequate for an experimental program. The considered opinion of the Producer-Director and the Project Director is that production costs could be reduced for non-experimental, continuing programs. Had there been tighter budgets, it is believed the productions would not have had the finish or the visual range which they possessed. With a tight budget, the two remote telecasts, the San Quentin interviews, and the three-camera Creative Arts telecast of "Westward the Tide," would have been impossible. The latter was the culmination of the Creative Arts 10 series, in which all the elements of music, drama, fine art, and the dance were welded into one completely original San Francisco State College creative exercise. It was staged in the College auditorium for a live audience of 750 people, and telecast for the students in the course and for other San Francisco Bay Area viewers.

Estimates of production costs are included in the section that follows.

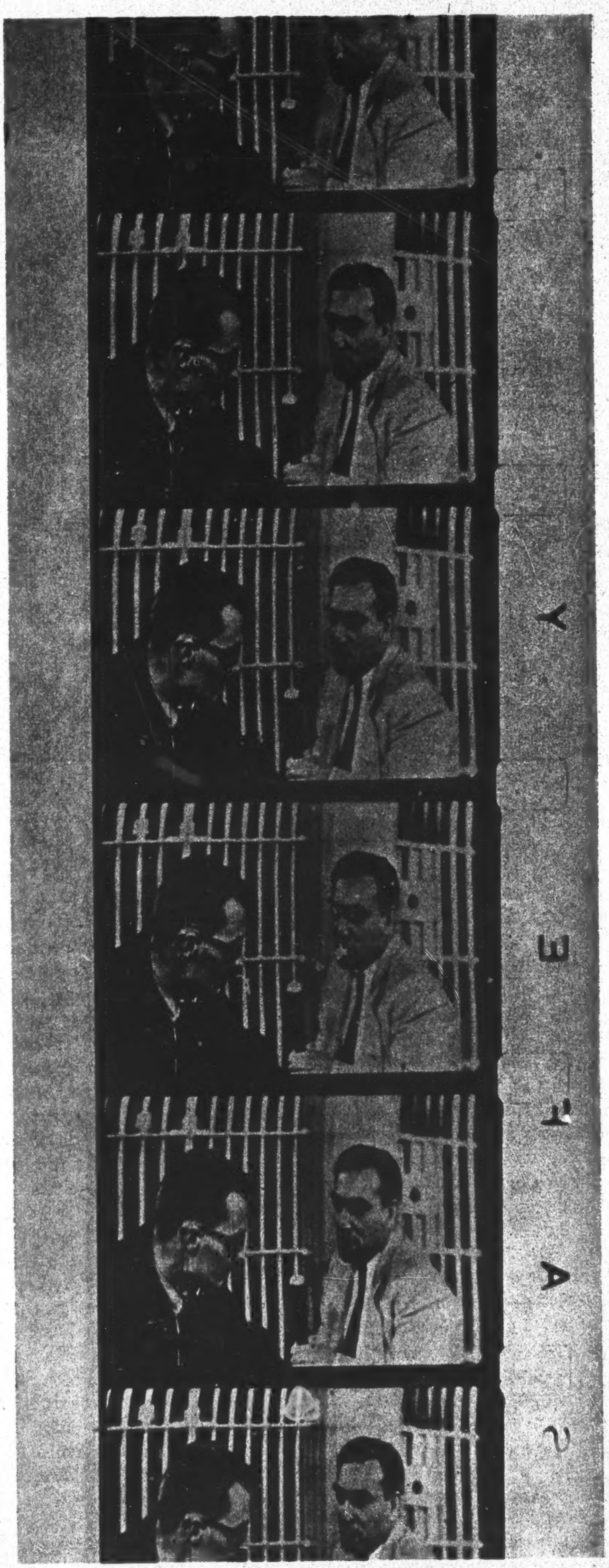

Figure 5.

An inmate of San Quentin outside a cell door being interviewed by Psychology 10.1 instructor. Frames taken from a kinescope recording.

Kinescope Arrangements by Orv Goldner-Mike Blas

Figure 6. A dramatic excerpt used as illustrative material for a Creative Arts 10 program.

Analysis of Costs

An aim of the study was to analyze the cost of open-circuit televised instruction accompanied by quality production. The significance of this aspect of the study is apparent. After preliminary experimentation, boards of trustees, departments of finance, legislators, and school administrators must ask, "How much does it cost?" Further, total cost, though important, is not as useful as an analysis of costs; it is on the cost of individual items such as capital outlay, maintenance, expendable supplies, and salaries and wages that budgets are built. To this end, the Project kept records of all expenditures in accordance with budget practices of the College. This procedure allowed certain limited comparisons to be made between televised (At Home and On Campus) and conventional instruction.

Experimental research projects are not the best situations for estimating instructional costs. An experimental procedure, like a production model, is expensive at the outset because routines have not been established and full efficiency has not yet been achieved. Comparative costs sometimes are difficult to determine because existing accounting methods do not allow for comparisons of the type sought by the researcher. For example, although the total cost of a building may be known, the cost of a room within it can only be approximated. Further, costs can be made to differ by the modification or deletion of selected factors. Since experimental programs do not provide optimum conditions for estimating actual costs, any projections based on such analyses are bound to include some error; nonetheless, an extrapolation study should allow estimates to be made of future costs. It is hoped that the costs estimated at San Francisco State College will be of help to other institutions; however, this hope does not imply that these estimates can be generalized beyond the College.

Cost Index and Cost Factors

A number of approaches can be made to cost approximations. Following considerable study of possible methods and assessment of factors, the decision was made to compute an index that would reflect as accurately as possible the cost per student per course per semester. Cost factors were based on regular college enrollments only. Not included were the high school students, extension students and other viewers.

Cost factors:

1. Capital costs of buildings
2. Instructional salaries and instructionally related costs
3. Station time charges
4. Production expenses
5. Television administration

Factors excluded were those items not normally part of college budgets and that do not affect regular day students, for example, summer session and off campus activities.

Courses Selected for Analysis. Six courses were taught via television and of these Psychology 10.1 and Science 11 were selected for cost analysis. Psychology was judged to be rela-

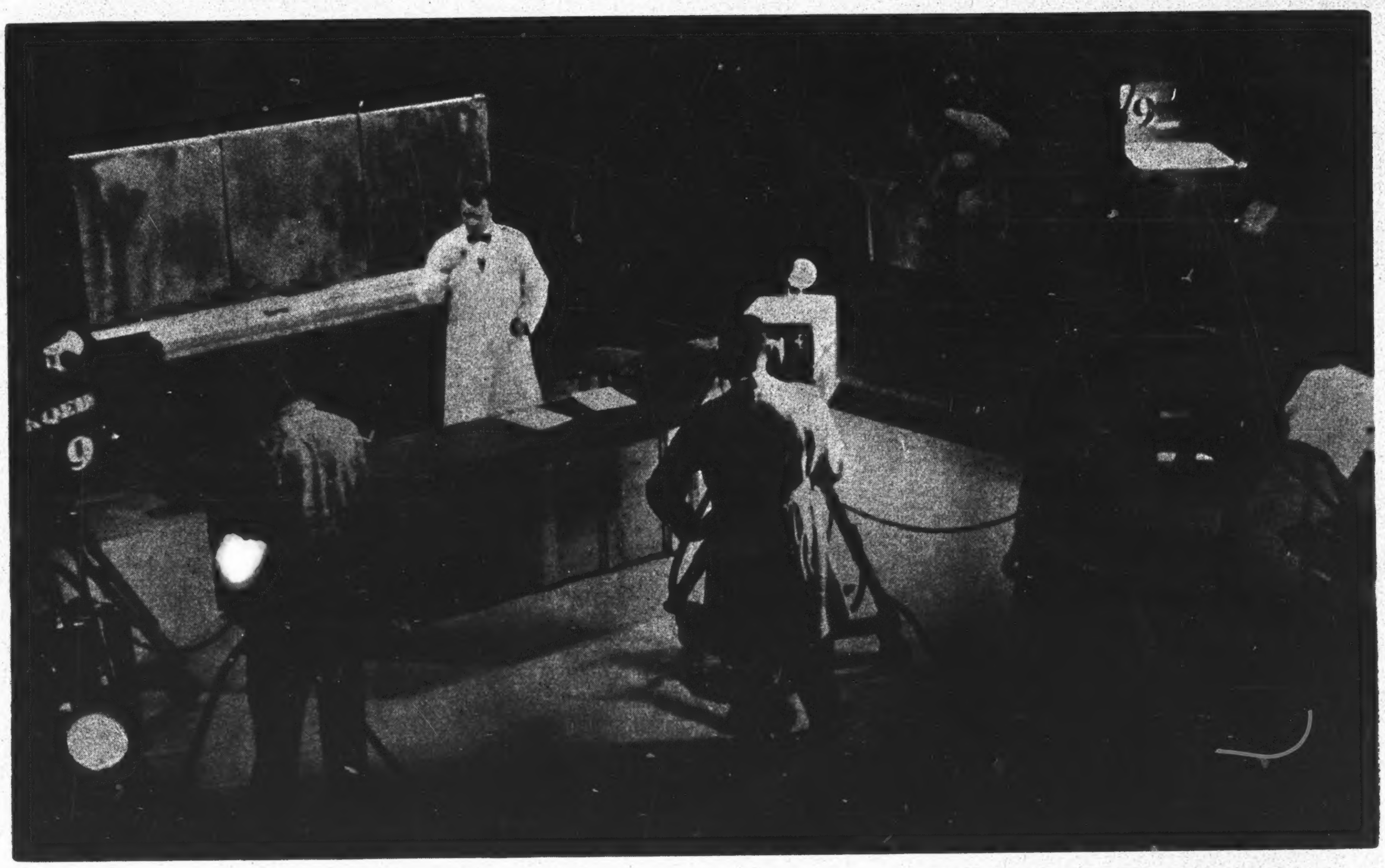

Figure 7. A view of the set for the Science II course. Rear projection screen is at the right and the chalk board at rear.

tively inexpensive because no special building facilities were needed, and it was believed to be representative of English 6.1 and Social Science 30. Science was considered to be moderately expensive and, although it required some special installation, costly laboratories were not essential. The cost figures for this course appear to reflect the costs for Science 10 and Creative Arts 10.

Capital Costs of Buildings. In determining the capital costs of buildings, two buildings in which the two courses could be housed were analyzed. The first building analyzed consists largely of lecture-discussion class rooms suitable for English, Social Science and Psychology. The second building contains specialized rooms and laboratories representative of facilities necessary for conducting beginning courses in science, but not those essential for teaching advanced and graduate courses in science. The first building cost $16.74 per square foot and the second building cost $18.00 per square foot; contracts for both buildings were let in 1951. Only actual construction costs of buildings were used for the cost study; depreciation was figured on a forty-year basis (eighty semesters) and eighty per cent utilization.

Instructional Salaries and Instructionally Related Costs. Salary costs for instructors were based on the midpoint of the associate professor rank; Project contributions for sick leave and retirement were included. A full-time faculty load per semester was twelve units or four three-unit courses. In the semester preceding actual teaching, instructors responsible for conducting the courses in the study were released from one-half of their regular teaching load for preparation of the course they were to teach the following semester. The same instructors were allowed one-quarter released time during the teaching semester.[1] Staff members assigned as discussion leaders were not given released time. Released time costs were prorated among Television at Home, Television on Campus, and Control groups. Somewhat more time was available to the instructor during the teaching semester than is apparent in the figures: For three unit courses, the instructor was assigned two television sections (six units or one-half load) and thus, with one television presentation, he met two classes. In effect, he was released an additional two hours for the second of the two televised classes. However, he did meet home groups on campus for weekly discussion meetings. In Science 11, the television instructor met two discussion sections in addition to his main televised lectures. One of these was an Home Assignment (no discussion) section.

Instructionally related costs were defined as all items not directly attributable to classroom teaching, yet essential to the furtherance of instruction. For example, included were budgets for college administration, student personnel services, health services, and library services. Maintenance costs, e.g., light, heat, power, water, and custodial salaries are included in the instructionally related costs. No attempt was made to establish a differential in the costs between the home and the campus students. It is believed that a televised instructional program with a minimum number of students receiving instruction off campus would make no appreciable difference in these particular costs.

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[1] In one instance, the instructor had already taught the course via television; he was allowed but three units released time.

Station Charges. Station charges were based on a rate of three hundred four dollars and fifty-five cents per hour. Principal items subsumed under station charges were: camera time, that is, forty-five minutes of live telecasting and fifteen minutes of camera rehearsal; set construction for each of the courses; station lighting and dressing of sets before each telecast; and overtime charges and remote telecast costs. Thirty hours of station time, totalling $9,136.50, were required for Psychology and forty-five hours, totalling $13,704.75, were necessary for Science.

Production Expenses. Production costs included the salary of the producer-director, graphic artist, secretary (part-time), fellowships, production student assistants, travel, and production items (film rentals, pictures, props, slides, etc.). Since experimental kinescopes were made on a pilot basis only and were not essential to the Project, their cost was not included in this analysis.

Television Administration. Television administration costs included general expenses, supplies, and student assistance used essentially for administrative purposes. To these costs were added those portions of the Project Director's and Office Manager's salaries attributable to television administration.

Subsequent Costs. Subsequent costs were computed two ways. The first method was based on projected enrollments using as a baseline the actual costs of the experimental program. The second method differed in that instructor released time was cut from three-quarter time to one-half time, discussion leaders were eliminated, and production was cut fifty per cent. In both methods one full-time faculty salary was added for each additional four hundred students. Student assistance, instructionally related costs, and building depreciation figures remained the same throughout both projections. Station charges, production costs, and instruction costs were reduced in proportion to increase in enrollments.

Table 68

Analysis of Initial Costs per Student for Instructing Psychology 10.1. Costs are Based on Sections of 33.33 Students Each

Item	Home*	Campus	Control	Conventional
Television				
Station Charges	$ 91.37	$ 91.37	$ —	$ —
Production	25.33	25.33	—	—
Administration	8.73	8.73	8.73	—
Instruction				
Instructor**	49.09	64.16	57.06	31.43
Related Costs	47.50	47.50	47.50	47.50
Room Depreciation	.11	.34	.34	.34
Cost Per Student	$222.13	$237.33	$113.63	$ 79.27

Note 1—Related costs include salaries and wages (less intructor salaries), operating expenses, and equipment. The three budget categories include, for example, college administration, student personnel services, health services, and library services; not included are summer session and off-campus activities.

Note 2.—Since certain costs were apportioned among the three groups in the experiment, the groups must be considered together.

*There were two TV at Home sections.

**Instructor costs include ¼ released time for the teaching semester and ½ released time for the previous semester.

Table 69

Analysis of Initial Costs per Student for Instructing Science 11. Costs are Based on 100 Students per Experiment Group and 75 Students per Conventional Group

Item	Home	Campus	Control	Conventional
Television				
Station Charges	$ 68.52	$ 68.52	$ —	$ —
Production	18.93	18.93	—	—
Administration	7.52	7.52	7.52	—
Instruction				
Instructor*	43.65	43.65	48.88	23.14
Related Costs	79.17	79.17	79.17	79.17
Room Depreciation	.60	1.54	1.54	1.54
Cost Per Student	$218.39	$219.33	$137.11	$103.85

Note 1.—Related costs include salaries and wages (less Instructor salaries), operating expenses, and equipment. The three budget categories include, for example, college administration, student personnel services, health services, and library services; not included are summer session and off-campus activities.

Note 2.—Since certain costs were apportioned among the three groups in the experiment, the groups must be considered together.

Note 3.—The conventional class is Biology 1, a four unit general education course; for the purpose of this study it was equated to five units.

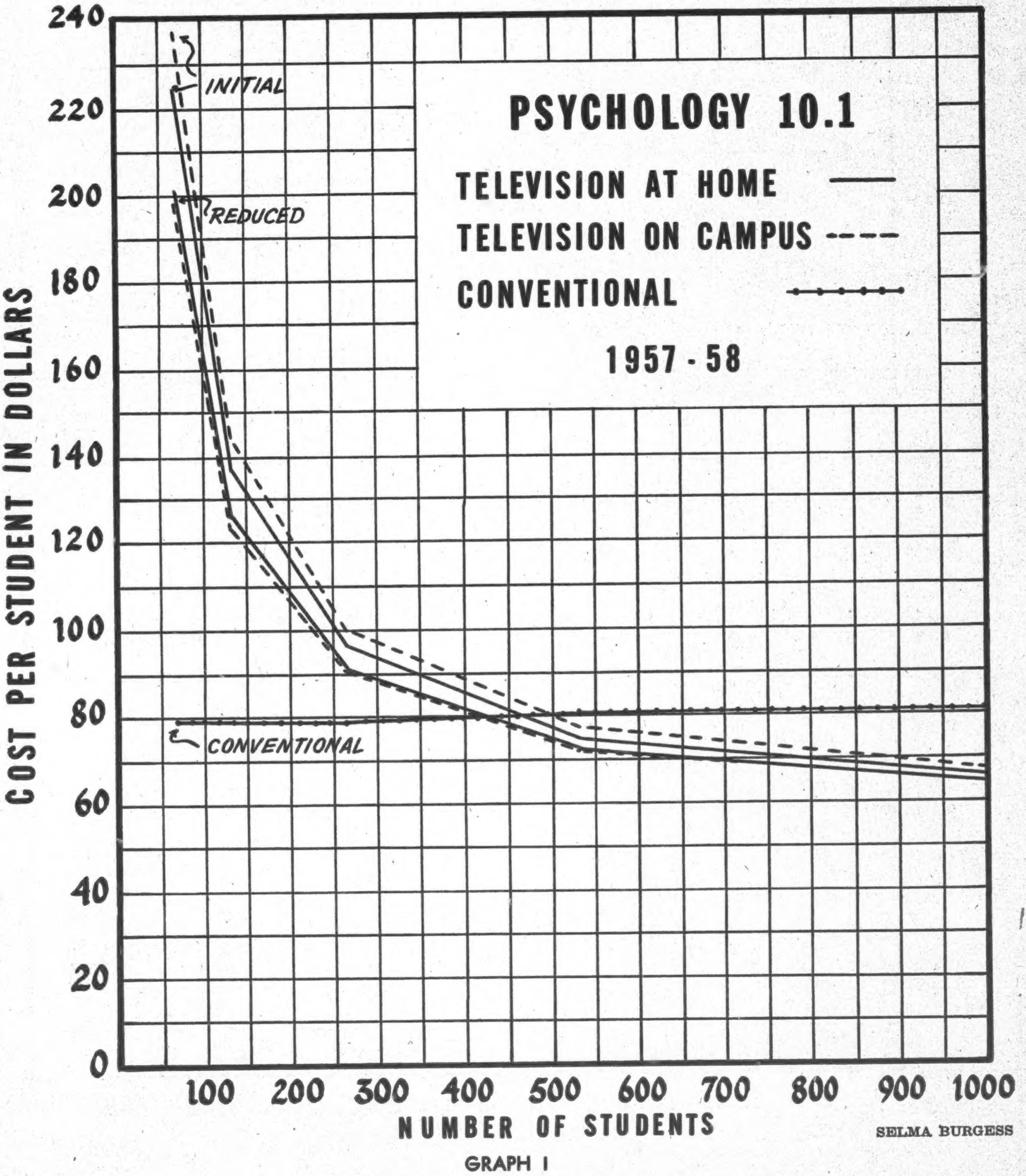
*Instructor costs include ¼ released time for the teaching semester and ½ released time for the previous semester.

A comparison of the initial costs of televised and conventional classes with enrollments of the size in the experiment showed television, as expected, to be more expensive than conventional instruction. However, projected enrollments clearly indicate that by increasing the number of students receiving instruction via television, a break-even point can be reached where televised instruction costs no more than conventional instruction. In Psychology 10.1, the break-even point, that is, the projected number at which the cost per student for televised instruction would equal the cost per student for conventional instruction, is a minimum enrollment of about 950 students, were the course to be repeated. On a reduced cost basis, the break-even point would be about 825 students. In Science 11, the break-even points were estimated to be higher than for Psychology. On an initial cost basis the estimate is about 1440 students and, on a reduced cost basis, the estimate is about 1120 students.

Discussion

The initial costs of open-circuit televised instruction are higher than for conventional instruction. The fact is, station charges, quality production, and professional direction are expensive items. The initial presentation of a course requires faculty released time for preparation, both before and concurrent with actual instruction, and original visual materials and props (charts, diagrams, models, sets) in quantity. Further, in considering these cost figures it should be noted that they were derived from an experimental setting which was attempting to insure high quality instruction and production. Repetition of the same courses could take advantage of the experience, and certain costs might be reduced.

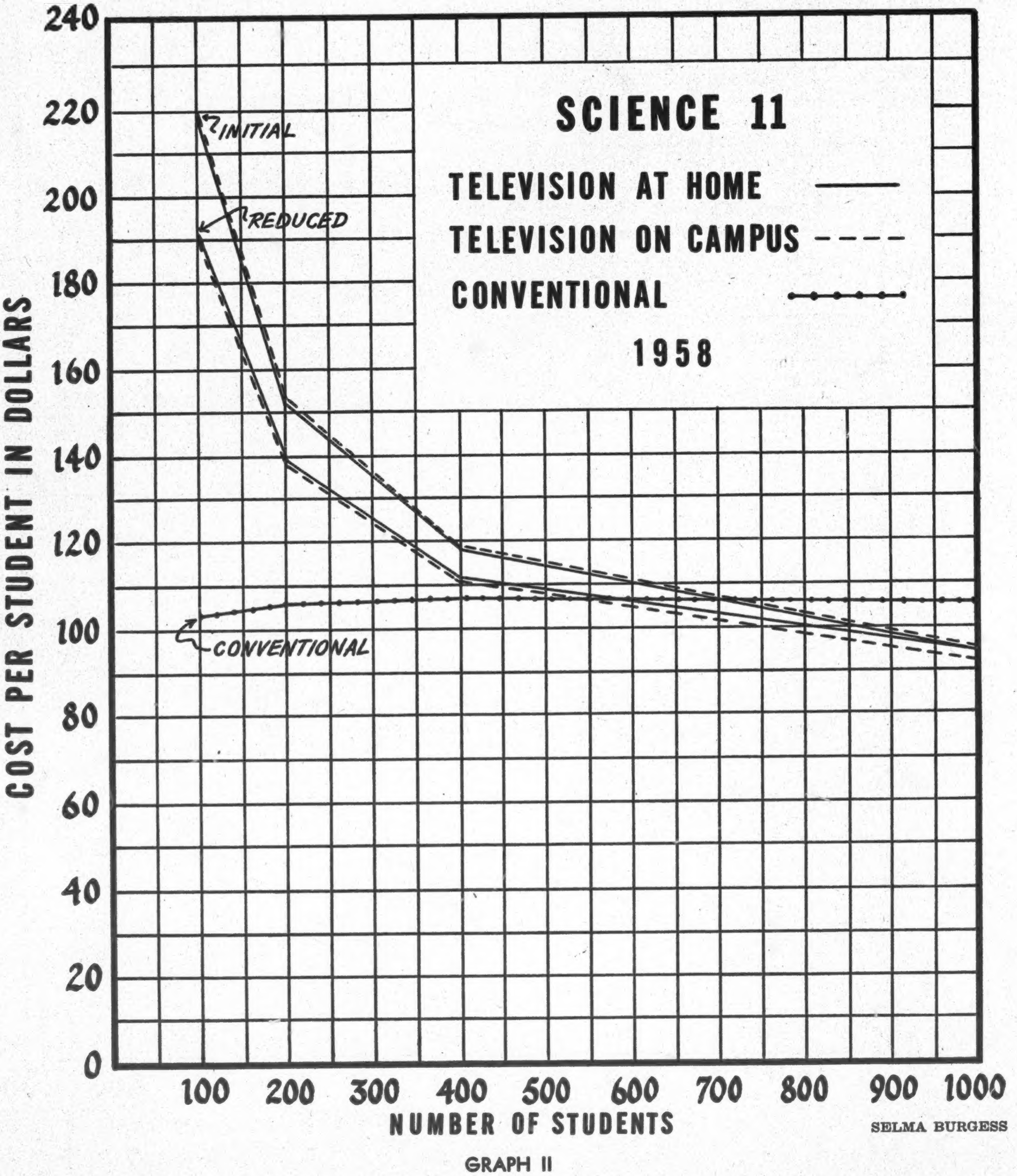
It should be noted that Television at Home has the possibility for increasing the use of existing buildings, and, perhaps, deferring construction of additional rooms. For example, for three hundred Television at Home students,



GRAPH I

Projected Costs of Televised and Conventional Instruction for Various Numbers of Students at Initial and Reduced Costs.

To approximate break-even points for Initial or Reduced Costs: Take one pair of lines, e.g., the two Initial lines, sum the separate estimates of the Number of Students as indicated at the point where each of the two lines intersects the Conventional line.



GRAPH II

Projected Costs of Televised and Conventional Instruction for Various Numbers of Students at Initial and Reduced Costs.

To approximate break-even points for Initial or Reduced Costs: Take one pair of lines, e.g., the two Initial lines, sum the separate estimates of the Number of Students as indicated at the point where each of the two lines intersects the Conventional line.

six classrooms could be freed during telecast hours. However, in considering the number of classrooms that might be freed, it should be remembered that the freed classrooms must be equated against such factors as capital costs and maintenance of television equipment, station time costs, production costs, and the advantages or disadvantages of amortizing needed capital outlay for additional buildings over a long period of time through bond issues or similar methods of financing.

A most hopeful factor in televised instruction is that initial expenses are comparatively fixed regardless of the number of students served. This is especially true of air, production, and instructional costs. There are other possible savings. Once teaching materials are acquired or located, most can be reused again and again. For example, charts of economic statistics may be reused with some minor modifications for up-dating. Further, once production personnel learn the resources of their academic and cultural community (on and off campus) efficiency is improved.

A question raised in the production-direction section is relevant here. Restated, it is: Was the relatively high cost of production positively reflected in the amount learned by the students? Although the study was not designed to provide an answer, in the judgment of the Producer-Director savings could have been effected in the production of the programs. However, the Producer-Director believed the telesessions would not have had the polish they possessed. Some research should be directed to this problem; it appears to be an important one from a cost standpoint.

Break-Even Points. Computed break-even points must be considered in relation to the size of the institution and to the total number of students enrolled in a specific course and in relation to the type of discussion groups that are used. Typically, San Francisco State College enrolls about nine hundred freshmen each fall and about three hundred each spring. A study of the break-even points for the Psychology course shows that most, if not all, freshmen entering in the fall would have to be enrolled in a televised course before economic feasibility could be attained. For Science 11, economic feasibility could be attained by offering the course in alternate years. Small group discussion, another factor to be considered, increases the cost of instruction; the presence of an instructor during actual teleclasses further adds to costs, and conversely, the absence of discussion leaders lowers costs. It should be noted that although the data in Part III indicated that, in the majority of cases, the relationship between small group discussion and acquisition of facts was not statistically significant, five of the six Home Assignment groups ranked last among the four supplementary methods groups.

At this juncture, a qualifying factor must be noted. The number of Television at Home viewers is limited. In the study it was learned that in any one freshman course about one-third of the students could be enrolled in Television at Home groups. Students gave the following reasons for not participating in an At Home group: commute schedules, part-time work, family responsibilities, other class schedules, no access to television off campus, and poor television reception. Of course, the one-third figure may not be the true proportion that might ultimately be served at home. The figure may vary considerably from college to college, depending on such factors as the nature of the student body and the quality of television reception in the area. However, the one-third figure remains the best estimate available for this study. If the one-third figure is accepted and a maximum freshman enrollment of nine hundred students is assumed, then it follows that in the fall about three hundred students could be enrolled in Television at Home groups and the remainder would have to be enrolled in Television on Campus sections.

Summary. From the data it is possible to make three statements about open-circuit television with quality production as it was conducted at the College: (1) It is economically feasible to offer lecture-discussion courses, for example, Psychology, by television if enrollments of about 950 are attainable; (2) More expensive courses, e.g., Science, become economically feasible if they can be offered to a minimum of 1440 students. As it is evident that the great majority of colleges do not have sufficient students to enroll these numbers in specific courses, the data seem to indicate that a single college using open-circuit television must justify it on bases other than costs; (3) The cost of televised instruction, after initial costs have been met, may be reduced for subsequent semesters and break-even points may be lowered.

PART FOUR

Summary and Implications

Experiments at San Francisco State College with open-circuit instructional television were undertaken in response to the stresses on higher education. According to J. Paul Leonard,[1] there are five main pressures on higher education: "(1) the pressure of sheer numbers; (2) the pressure to maintain standards commensurate with a high quality of academic achievement; (3) the pressure of public opinion for proper education for superior students; (4) the competitive pressure in recruiting an adequate teaching staff of superior quality; and (5) the pressure for adequate funds to house and teach youth."[2] The five pressures adequately describe the condition of higher education at the time the report for Project Number One was being prepared. Since then, the rapid changes in international affairs have given new significance to what is probably the oldest pressure on education: The survival of a culture is, in a large measure, dependent on the quantity and quality of education the culture provides for itself. If education is conceived as the transmitter of culture, education must be broadly defined; and, since higher education is but one of the institutions for education within the culture, the colleges and universities can only be expected to shoulder a part of the burden. Nonetheless, in a modern technical culture, colleges and universities are the institutions expected to train the leaders and technicians necessary for survival.

The urgency of the aforementioned pressures has not gone unnoticed. State and national governments have directed attention and assistance to students, colleges, and universities. Private enterprise, labor unions, and individual citizens through grants and foundations have contributed materially to higher education. With attention and support has come some impatience and criticism, but, for the most part, educational leadership has retained the responsibility for meeting current pressures.

To meet the complex of pressures on education, a variety of approaches have been suggested. Diversity of approach has been necessary because no one method provides a cure-all. For example, although several students can be added to many lecture-type courses, an equal number cannot be crowded around a laboratory station. Moreover, there are limits even in lecture-type courses; students cannot be added to rooms beyond their rated capacities.

Inevitably, the search for a reduction of the pressures on staff, space, and student abundance led to a consideration of open-circuit television. To many, the medium appears to have the potential of meeting at least two pressures: Television could counter the threat to quality instruction during a period of faculty shortage and student abundance. By using available superior faculty to reach vast numbers of students, two goals could be reached by one bold move. To some, television possesses additional possibilities. Superior instructors teamed with adequate instructional support, production assistance, and the versatility of television cameras could result in an improvement in the quality of instruction. Moreover, quality televised instruction could be conducted at a cost per student below that of conventional instruction. Unquestionably, the validity of the complex case for instructional television must be estimated since, if television has a high degree of validity, it promises both the cake and the savoring of it.

Experimentation at San Francisco State College

A resume of the aim, scope, design and results of the experiments with open-circuit television at San Francisco State College allows for background information that, hopefully, will be useful in considering the implications of the study.

Aims of the Study. The first concern was to compare the performances and attitudes of three groups of students (Television at Home, Television on Campus, and Conventional on Campus) taught by the same professor, using the following objective measures: content achievement; critical thinking; self-insight; motivation; attitudes to television, instructor, subject matter, and course content; and opportunities for friendships. The second objective was to estimate the effects of supplementary educational experiences which included varying amounts of discussion, demonstration-activity, and home and library assignments. Results related to these aims have implications for faculty shortage and student abundance. Another major aim was to collect evidence bearing on the teaching of college courses to high school students. Results related to this aim have implications for accelerated learning and for the deepening and broadening of academic experiences. The fourth purpose was to explore aspects of the teaching-learning process, namely, in what ways are televised and conventional instruction similar and dissimilar, apart from the acquisition of information? The implications of this portion of the study would seem to be related to some of the less tangible objectives of college education. The final major aim was to assess the administration, production, and cost of open-circuit instructional television in an experimental setting. The College administration was of the persuasion that before the College could commit itself to instructional television, the economic aspects of the television medium had to be estimated.

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[1] Dr. Leonard, former President of San Francisco State College, is now President of the American University, Beirut, Lebanon.

[2] R. E. Dreher and W. H. Beatty, Instructional Television Research, Project Number One: *An Experimental Study of College Instruction Using Broadcast Television*, p. 62.

Scope of the Study. Experimentation was conducted in general education courses representative of six major academic areas. More than two score instructors were involved as teachers or discussion leaders with additional staff members participating in planning and evaluation. The subjects studied represented several populations: regular college students; selected groups of high school students; adults at large and carefully selected inmates in a state prison. The courses were offered through the facilities of KQED, the Bay Area Educational Television Station; the courses were entirely produced and directed by personnel of the College.

Experimental Designs. The experimental designs allowed comparisons of performances of students in three groups: Television at Home, Television on Campus, and Conventional on Campus. Further, in the Science courses, each of these groups was divided into four sub-groups, allowing for weekly discussion, bi-weekly discussion, weekly activity-demonstration, and home-assignment (no campus meetings). Control measures included academic aptitude, grade point average, content achievement, and motivation.

Results. Students who received instruction via television compared favorably with students enrolled in regular campus classes with respect to acquisition of information or, as in the case of English 6.1, the ability to write an essay. An exception to this generalization was Creative Arts. Further, students, whether of high or low academic ability, acquired information as well by television as by conventional instruction. Moreover, in Science, the various kinds of supplementary instruction, whether weekly, bi-weekly, demonstration-activity, or home and library assignments, were found to be about equally effective in promoting factual learning. Apparently, as long as course goals are defined in terms of gains in information or writing skill, students appear to learn about as well via television as through face-to-face instruction.

With respect to gains in critical thinking and self-insight, there were no statistically significant differences between television and conventional groups. Further, in Science, critical thinking and self-insight were about as effectively developed by one of the four supplementary types of instruction as by any one of the others. However, in five of the six courses, conventional groups made higher mean gains on self-insight than did the television groups.

Selected high school students in Science 11 and English 6.1 made smaller gains in factual information or in writing skill than did college students with whom they were matched. However, in English, the college students' final mean score was still below the initial score of the high school students.

Analyses of student and teacher statements describing instruction indicated that the three subject groups (high school students, college students, instructors) agreed on a common core of processes that constituted effective and ineffective instruction. Further analysis indicated that there were significantly more kinds of incidents described as effective or ineffective in conventional instruction than in televised instruction. Students in both televised and conventional instruction felt that what the teacher said or did was important but reacted negatively to this emphasis more often in conventional instruction than in televised instruction. Student attitudes toward teaching-learning varied from one learning context to another, but this was not haphazard: Students placed more emphasis on what the teacher did in televised instruction than in the conventional classroom and gave more value to student participation in conventional instruction than in televised instruction. The results seem to indicate that something of value was found in both teaching-learning situations and any learning situation may be valuable to an individual as long as it satisfies some personal need. However, the variety of means by which satisfactions and dissatisfactions of the learner occur are fewer in televised instruction than in the conventional classroom.

The feasibility of television as a medium of instruction can be considered in terms of student acceptability, administrative organization, production and direction of instructional programs, and cost. Generally, students accepted television as a medium of instruction. At Home students were more positive concerning their attitudes to television than were students enrolled in television classes on campus. The degree of acceptance varied from group to group, being neutral or favorable in seven groups and unfavorable in three. Moreover, the follow-up study of students who had taken English 6.1 via television in the Spring, 1957 and who in the fall enrolled in conventional sections of English 6.2 (the second half of the year course) indicated an overwhelming preference for regular campus instruction.

Experience at this College with instructional television suggests the following: Instructional television should be placed within the administrative organization of the instructional area of the College. Cognizance must be taken of the numerous functions in instructional television administration and provisions must be made for adequate staff. Observations of production and direction indicate that the instructors and the College can maintain control over the academic quality of televised courses by using local production and direction staff. Instructors are able to adapt successfully to televised instruction when adaptation is facilitated through a series of planned preliminary experiences. Further, it was demonstrated that the College and Station KQED hold similar educational goals and can work closely and cooperatively in the presentation of quality televised courses.

The analyses of cost data, based as they were on experimental, quality-produced, open-circuit television, allowed three statements: (1) It is economically feasible to offer lecture-discussion courses by television if enrollments of about nine hundred and fifty students are attainable; (2) More expensive courses are feasible when a minimum of fourteen hundred and forty students are available; (3) The cost of televised instruction, after initial costs have been met, may be reduced for subsequent semesters and break-even points may be lowered.

Implications

The data on which the following implications are based were collected at one college only, San Francisco State, and reflect the unique characteristics of this College. It follows that generalizations to other institutions must be made with caution.

1. Instruction by television is an effective method in courses whose primary goal is the imparting of information. It appears to follow that, through the medium of television, presently available instructors can effectively teach a greater number of students than they now reach in regular campus classes.

2. In those courses that purport to do more than impart facts, e.g., provide for direct experiences or attempt to modify attitudes, the implications are not yet clear. For example, in Creative Arts 10, examination scores of students in the Television at Home group were not as high as those of students in the Conventional class. Further, English 6.1 (Television on Campus) and Creative Arts 10 (Television at Home) displayed a negative attitude toward the television medium and a follow-up study in English 6.2 indicated that students who had experienced both televised and conventional instruction strongly preferred regular campus classes. Finally, some data suggest that certain goals. e.g., self-insight and friendships, may be better fostered by conventional than by televised instruction. If a decision is made to teach by television in areas that aim to develop more than a mastery of information, then the College must seek means of compensating for some of the possible limitations of instructional television, either in the televised course itself or in other campus classes.

3. Since matched high school and college students appeared to acquire mastery of content at differential rates, an implication is that before a decision is made to offer college credit to high school students on a regular basis, further study should be made. Along with such study, consideration should be given to other alternatives that could foster the goals of acceleration and deepening of academic experiences for able high school students. Experience in the granting of college credit to high school students suggests that it is essential to create appropriate liaison machinery in order to advance the close and continuing cooperation between the high schools and the College.

4. Although the exploratory study of attitudes toward the teaching-learning process suggests that television is, at present, a more constrictive medium in relation to satisfying and dissatisfying instructional experiences, television cannot be dismissed as an instructional medium on this basis alone. Among the array of reasons suggesting caution is this: What is learned is, to some extent, affected by how the learner learned to learn. Although learning via television may not allow as many opportunities for satisfactions or dissatisfactions at the present time, it may be that with the broadening of opportunities to take classes through this medium, the student eventually may come to find as many satisfying and dissatisfying processes in open-circuit television as are found in conventional teaching-learning situations. The data imply that, if television is used on a regular basis, there should be continuing study directed towards identifying and implementing ameliorative measures.

5. If it is decided to adopt open-circuit instructional television, the College should continue to control production and direction of its televised academic offerings.

6. Although economic feasibility of televised instruction can be attained in certain courses, the break-even points of conventional and televised instruction are so close to the number of currently enrolled students that there does not appear to be any pressing economic need to implement even a limited open-circuit program at this time. However, this may not be true in the future. Enrollments are likely to rise and qualified instructors may become increasingly scarce. Should either or both conditions develop, conversion to some televised instruction then would become desirable from an economic standpoint. In anticipation of this eventuality, the following are suggested:

a. Studies should be made of possibilities for broadening the base number of students that could be enrolled in any one course, with consideration given to the possibility of joint offering of courses by more than one institution of higher learning.

b. Investigations should be undertaken to explore all the ramifications of repeating courses using kinescopes or video tapes.

c. Comparative studies should be made of the costs of open-circuit television, with and without locally-owned equipment, and of closed-circuit television with college-owned equipment with consideration given to costs related to maintenance and depreciation of equipment. Additional comparative studies should be made of the advantages and disadvantages of deferring building construction, keeping in mind the cost of different methods of financing expenditures.

Suggestions for Further Research

Once the research project was underway, possibilities for additional research were noted. The list of suggestions that follows represents possible problem areas but does not pretend to state specific hypotheses or research questions.

Suggested Problems: The Teaching-Learning Process

1. What would be the effect on the attitudes of students toward the teaching-learning process if prolonged, massive dosages of televised instruction were experienced by students?
2. Why do students evidence greater dependence on the television instructor than on the regular classroom instructor? Would the dependency relationship be altered if the instructor's role on television were underplayed; i.e., if the instructor were to become essentially an unseen narrator?
3. Is dependence on the instructor a transitory phase for entering freshmen, or is it also common to sophomores, juniors, and seniors?
4. Are there dimensions of personality which are related to dependence on television instructors? Regular campus instructors?
5. What effects on learning and attitudes toward the teaching-learning process would be observed if an actor were substituted for the television instructor and if regular, fully-qualified instructors were used as discussion leaders?
6. What effects on the performance of able high school students would be observed if high school students were to meet the same administrative requirements as the college students, e.g., formal enrollment in college courses, completion of course requirements, and permanent assignment of a course grade?
7. Since most of the college subjects in the study were freshmen, the attitudes expressed toward televised instruction and the teaching-learning process do not necessarily reflect the attitudes of sophomores, juniors, seniors, and graduate students. This fact is the basis for the questions that follow:
    a. Can televised instruction be conducted effectively in advanced courses, e.g., in seminars or courses which rely heavily on student-instructor interplay?

b. Is televised instruction equally acceptable to all undergraduate and graduate classes? If acceptability differs among classes, what factors other than class year may be related to acceptance or rejection?

Suggested Problems: Production

What differences, if any, in performance and attitudes to the teaching-learning process would result if two nearly identical courses were offered via television, one course would be produced on an adequate budget and the other on a severely limited budget (assume all other factors are equal)?

Suggested Problems: Administration

1. If college courses were recorded on tape or on kinescope film, what safeguards would be essential for the maintenance of faculty morale?
2. What are the comparative costs of: (1) Owning and operating open-circuit instructional television on a regular basis? (2) Owning and operating equipment but renting transmission facilities? (3) Owning and operating closed-circuit equipment? How do the various television costs compare with the construction, operation and maintenance costs of buildings assuming different methods of financing outlays?

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APPENDIX A

The San Quentin Study

This portion of the study was ancillary to the main project, but findings are included because the nature of the results suggest a means by which qualified, institutionalized persons may advance toward certain educational goals via open-circuit television.

Selected inmates at San Quentin Prison were enrolled for college credit as extension students in Psychology 10.1, Science 10 and Science 11. Tne students were held to the same reading assignments, academic standards, and examinations as regular college students enrolled in the same courses. In Science 10 and 11, there was but occasional contact with a discussion leader. In Psychology 10.1, a graduate intern happened to be assigned to the prison; he met the Psychology 10.1 students once a week. In addition, the Psychology television instructor visited the group a number of times.

Table 70 presents pretest and posttest results in Science 10 and Psychology 10.1 on three measures: Critical Thinking Appraisal, Self-Insight, and Content. Table 71 presents a distribution of final grades in the three courses. The data in Table 72 deal with the results on four attitude scales given in Science 10 and Psychology 10.1.[1]

Table 70

Summary of Results on Three Pretests and Posttests San Quentin Extension Students

Course and Instrument	N	Mean	s.d.	t	Statistically Significant Gain
Science 10					
Critical Thinking Appraisal	15	–1.9*	12.0	0.6	No
Self-Insight Scale	13	4.6	10.5	1.6	No
Content Test	14	5.5	7.2	2.8	Yes (.02)**
Psychology 10.1					
Critical Thinking Appraisal	9	2.2	5.3	1.2	No
Self-Insight Scale	9	2.9	10.0	0.9	No
Content Test	9	5.9	5.8	3.1	Yes (.02)**

*Chance deviation from zero.
**Significant beyond the 2% level.

In Science 10 and Psychology 10.1, the students made significant gains in content. The t-ratios were significant beyond the two per cent level. However, no significant gains were made in either course on the Watson-Glaser Critical Thinking Appraisal and on the Self-Insight Scale.

Table 71

Distribution of Final Grades in Three Courses. San Quentin Extension Students

Final Grade	Science 10	Science 11*	Psychology 10.1
A	2	5	2
B	5	3	3
C	6	2	4
D	1	2	0
F	0	1	0

Note.—Grades for extension students were based on grade curves derived from the performance of regular college students enrolled in the same courses.

*One incomplete and one withdrawal are not included.

The distribution of grades do not appear to be unusual except for Science 11. However, the total number of subjects is small and, since they were selected, they should not be considered representative of the population from which they were drawn, nor should they be considered representative of institutionalized persons in general.

In both Science 10 and Psychology 10.1, the San Quentin students reacted favorably to course content and to instructor, and they expressed themselves as highly interested in the subject matter presented in the courses. All t-ratios were significant beyond the one per cent level. On the Attitude to Television scale, the results were not conclusive; students in Psychology 10.1 were favorable to television, but students in Science 10 were neutral.

The acceptance of television as a medium of instruction in one course and an equivocal position toward it in the other does require some explanation. No attempts were made to compare results obtained in the courses because controls could not be placed on differences in course content, instructors, students, etc. Further, the courses were not comparable from the standpoint of what took place in the course as far as the students were concerned. On the one hand, in Psychology, a qualified discussion leader was available on a weekly basis; in preparation for a telecast, the Psychology instructor personally interviewed each member of the class for an hour or more; a remote open-circuit telecast was made from within the prison featuring live interviews with members of the class; the content of the Psychology course may have had certain personal implications for the students. On the other hand, in Science, contact between the Science instructor and the students was limited to a few visits. These definite differences between the courses may have produced an effect (Hawthorne effect) that worked strongly in favor of Psychology. These

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[1] Data in Science 11 were incomplete.

Table 72

Summary of Results on Four Attitude Scales
San Quentin Extension Students

Course and Scale	N	Mean	s.d.	t[1]	Statistically Significant	Student Attitude
Science 10						
Attitude to Course Content	12	33.7	12.6	–4.51	Yes (.01)**	Favorable
Attitude to Instructor	10	32.8	16.5	–3.12	Yes (.03)*	Favorable
Attitude to Television	11	49.3	15.1	–0.16	No	Neutral
Interest in Subject Matter	11	29.6	15.7	–4.33	Yes (.01)**	Favorable
Psychology 10.1						
Attitude to Course Content	9	29.0	4.6	–14.38	Yes (.001)***	Favorable
Attitude to Instructor	11	26.7	8.5	–9.09	Yes (.001)***	Favorable
Attitude to Television	10	37.8	6.0	–6.42	Yes (.001)***	Favorable
Interest in Subject Matter	10	22.6	8.5	–10.36	Yes (.001)***	Favorable

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*Significant beyond the 3% level.
**Significant beyond the 1% level.
***Significant beyond the .1% level.

[1] $t = \frac{\bar{X}_1 - 50}{\frac{s}{\sqrt{N}}}$

data seem to allow the conclusion that a neutral attitude toward televised instruction may result even with minimal contact between students and instructor and that a highly favorable attitude may occur with supplementary discussion and instructor attention.

Summary

Small groups of selected institutionalized persons were enrolled in three regular college courses taught by television. Students made significant gains in content; eighty-nine per cent made a satisfactory (C) grade or better. Student attitudes toward course content, instructor, and interest in subject matter were significantly favorable. Favorable student attitude toward television was believed to result, in part, from weekly discussion and personal contact with an instructor.

APPENDIX B

Table 73

Comparability of Experimental and Control Groups on Pretests in Six Courses
Analysis of Variance F-Ratios

Course	S.C.A.T.	Watson-Glaser	Individual Inventory	General Content
Science 10				
Medium	0.11	0.35	1.02	0.70
Supplementary Discussion	1.73	2.18	0.19	1.32
Interaction	0.90	1.18	1.16	0.91
Science 11				
Medium	1.70	1.47	1.78	1.10
Supplementary Discussion	1.57	0.24	2.12	0.54
Interaction	0.83	2.18	0.69	2.70
Psychology 10.1	0.17	1.21	0.24	0.12
English 6.1	2.70	0.58	1.02	4.88*
Social Science 30	0.23	0.49	0.85	0.04
Creative Arts 10	0.07	Not Given	0.86	1.17

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*Significant beyond the 5% level.

APPENDIX C

Table 74

Summary of Results on Edwards Personal Preference Inventory Analysis of Variance F-Ratios

	Science 10			Science 11		
	Medium	Supplementary Discussion	Interaction	Medium	Supplementary Discussion	Interaction
Achievement Drive	0.34	0.57	1.09	0.50	2.43	2.06
Deference	0.12	0.66	0.80	0.19	1.23	0.46
Order	3.57*	2.81	0.86	4.31*	0.63	1.03
Exhibition	1.10	2.70	1.58	0.37	0.62	0.81
Autonomy	0.33	0.72	0.84	1.04	0.70	0.62
Affiliation	1.86	3.64*	0.33	0.06	0.02	0.44
Intraception	1.53	1.34	0.20	3.53*	0.05	0.83
Succorance	1.47	0.07	1.47	0.78	1.42	1.41
Dominance	0.78	1.48	0.89	0.25	1.00	1.23
Abasement	0.90	0.72	0.64	0.94	1.26	1.57
Nurturance	0.25	1.48	0.67	0.15	0.56	0.81
Change	1.36	1.45	1.44	0.83	0.87	0.87
Endurance	1.02	0.65	0.67	3.20*	0.32	1.77
Heterosexuality	0.62	0.35	0.65	0.01	0.45	0.99
Aggression	0.06	1.42	0.95	0.21	0.42	0.82

*Significant beyond the 5% level.

Table 75

Summary of Results on Edwards Personal Preference Inventory Analysis of Variance F-Ratios

	Psychology 10.1	English 6.1	Social Science 30	Creative Arts 10
Achievement Drive	0.70	0.16	0.40	0.28
Deference	0.27	1.04	0.86	0.60
Order	0.66	0.57	1.35	2.78
Exhibition	0.23	0.08	0.58	2.29
Autonomy	0.19	2.09	0.12	0.26
Affiliation	1.60	2.80	1.50	0.02
Intraception	0.49	1.66	2.26	2.77
Succorance	0.32	0.29	0.02	0.02
Dominance	0.49	0.46	1.16	4.42*
Abasement	1.79	0.15	0.17	0.05
Nurturance	0.24	1.73	0.44	4.68*
Change	0.20	4.50*	0.20	0.00
Endurance	0.21	1.89	1.75	1.77
Heterosexuality	0.28	0.08	0.10	0.55
Aggression	1.25	1.62	0.01	2.66

*Significant beyond the 5% level.

APPENDIX D

Table 76

Summary of Results on Bartlett's Test for Homogeneity of Variance F-Ratios

	Science 10	Science 11	Psychology 10.1	English 6.1	Social Science 30	Creative Arts 10
High Ability	1.06	1.13	2.93*	2.71	1.50	0.34
Low Ability	1.96*	1.16	8.09**	4.5**	0.41	0.45
Final Exam	1.69	1.07	1.88	9.02**	0.26	0.01
General Content Gain	3.98**	1.46	2.32	0.14	2.26	1.13
Watson-Glaser Gain	1.61	1.21	2.87*	2.68	0.79	....
Self-Insight Gain	3.11**	5.19**	0.56	0.93	8.10**	0.01
Attitude to Course Content	2.10*	0.55	0.82	0.78	0.23	3.20
Attitude to Instructor	1.11	1.18	0.85	1.58	0.20	3.74
Interest in Subject Matter	1.50	0.83	0.87	1.14	0.22	0.42
Attitude to Television	1.10	1.02	1.14	1.28	.....	.....

*Significant beyond the 5% level. **Significant beyond the 1% level.

APPENDIX E

Table 77

Gains on General Content Test. Analysis of Variance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	226.300	2	113.150	0.81	$p>.05$
Supplementary Discussion	118.500	3	39.500	0.28	$p>.05$
Interaction	553.500	6	92.267	0.66	$p>.05$
Within Subgroups	31,765.600	228	139.323		
Total	32,664.000	239			
Science 11					
Medium	484.234	2	242.117	2.89	$p>.05$
Supplementary Discussion	79.367	3	26.457	0.32	$p>.05$
Interaction	1,417.933	6	236.322	2.82	$p>.05$
Within Subgroups	19,129.800	228	83.903		
Total	21,111.334	239			
Psychology 10.1					
Category Means	655.490	3	218.497	1.99	$p>.05$
Within Subgroups	10,076.270	92	109.525		
Total	10,731.760	95			
English 6.1					
Category Means	15,966.333	2	7,983.167	7.55	$p<.01$
Within Subgroups	72,927.667	69	1,056.923		
Total	88,894.000	71			
Social Science 30					
Category Means	258.370	2	129.185	0.97	$p>.05$
Within Subgroups	6,811.112	51	133.551		
Total	7,069.482	53			
Creative Arts 10					
Category Means	382.531	1	382.531	5.34	$p<.05$
Within Subgroups	9,165.539	128	71.606		
Total	9,548.070	129			

APPENDIX F

Table 78

Achievement on Final Examinations. Analysis of Covariance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	3,473.903	2	1,736.951	12.79	$p<.01$
Supplementary Discussion	906.823	3	302.274	2.23	$p>.05$
Interaction	897.895	6	149.649	1.10	$p>.05$
Within Subgroups	30,554.197	225	135.790		
Total	35,832.818	236			
Science 11					
Medium	445.181	2	222.591	1.25	$p>.05$
Supplementary Discussion	67.459	3	22.729	0.13	$p>.05$
Interaction	2,040.879	6	340.146	1.91	$p>.05$
Within Subgroups	39,969.003	225	177.640		
Total	42,522.522	236			
Psychology 10.1					
Category Means	7,739.733	3	2,579.91	2.54	$p>.05$
Within Subgroups	90,246.121	89	1,014.00		
Total	97,985.854	92			
English 6.1					
Category Means	18,303.270	2	9,151.635	16.71	$p<.01$
Within Subgroups	36,140.770	66	547.587		
Total	54,444.040	68			
Social Science 30					
Category Means	282.118	2	141.059	2.78	$p>.05$
Within Subgroups	2,439.071	48	50.814		
Total	2,721.189	50			
Creative Arts 10					
Category Means	215.523	1	215.523	4.07	$p<.05$
Within Subgroups	6,620.844	125	52.967		
Total	6,836.367	126			

APPENDIX G

Table 79

Achievement of Highest 27 Per Cent. Analysis of Covariance F-Ratios.

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	2,107.138	2	1,053.569	9.77	$p<.01$
Supplementary Discussion	708.446	3	236.149	2.19	$p>.05$
Interaction	332.375	6	55.396	0.51	$p>.05$
Within Subgroups	6,147.458	57	107.850		
Total	9,295.417	68			
Science 11					
Medium	53.569	2	26.784	0.15	$p>.05$
Supplementary Discussion	90.075	3	30.025	0.16	$p>.05$
Interaction	1,845.816	6	307.636	1.67	$p>.05$
Within Subgroups	10,485.036	57	183.948		
Total	12,474.496	68			
Psychology 10.1					
Category Means	270.316	3	90.105	0.07	$p>.05$
Within Subgroups	27,213.507	21	1,295.881		
Total	27,483.823	24			
English 6.1					
Category Means	3,653.657	2	1,826.828	1.22	$p>.05$
Within Subgroups	17,900.730	12	1,491.727		
Total	21,554.387	14			
Social Science 30					
Category Means	528.632	2	264.316	3.73	$p>.05$
Within Subgroups	637.905	9	70.878		
Total	1,166.537	11			
Creative Arts 10					
Category Means	28.094	1	28.094	0.75	$p>.05$
Within Subgroups	1,142.089	31	37.748		
Total	1,170.183	32			

APPENDIX H

Table 80

Achievement of Lowest 27 Per Cent. Analysis of Covariance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	1,498.423	2	749.211	4.09	$p<.05$
Supplementary Discussion	898.274	3	299.425	1.63	$p>.05$
Interaction	459.662	6	76.610	0.42	$p>.05$
Within Subgroups	10,443.766	57	183.224		
Total	13,300.125	68			
Science 11					
Medium	346.674	2	173.337	1.46	$p>.05$
Supplementary Discussion	265.392	3	88.464	0.75	$p>.05$
Interaction	1,172.685	6	195.448	1.65	$p>.05$
Within Subgroups	6,766.689	57	118.714		
Total	8,551.440	68			
Psychology 10.1					
Category Means	8,181.490	3	2,727.163	2.55	$p>.05$
Within Subgroups	22,450.991	21	1,069.095		
Total	30,632.481	24			
English 6.1					
Category Means	7,382.066	2	3,691.033	1.70	$p>.05$
Within Subgroups	26,109.365	12	2,175.780		
Total	33,491.431	14			
Social Science 30					
Category Means	71.627	2	35.813	1.90	$p>.05$
Within Subgroups	169.452	9	18.828		
Total	241.079	11			
Creative Arts 10					
Category Means	01.429	1	1.429	0.03	$p>.05$
Within Subgroups	1,568.973	31	50.612		
Total	1,570.402	32			

APPENDIX I

Table 81

Critical Thinking. Analysis of Variance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	58.825	2	29.412	0.64	$p>.05$
Supplementary Discussion	147.683	3	49.228	1.07	$p>.05$
Interaction	343.342	6	57.224	1.24	$p>.05$
Within Subgroups	10,486.800	228	45.994		
Total	11,036.650	239			
Science 11					
Medium	63.858	2	31.979	0.61	$p>.05$
Supplementary Discussion	208.946	3	69.649	1.33	$p>.05$
Interaction	470.742	6	78.457	1.50	$p>.05$
Within Subgroups	11,934.350	228	52.344		
Total	12,677.896	239			
Psychology 10.1					
Category Means	132.032	3	44.011	1.16	$p>.05$
Within Subgroups	3,493.125	92	37.968		
Total	3,625.157	95			
English 6.1					
Category Means	53.445	2	26.722	0.46	$p>.05$
Within Subgroups	4,046.875	69	58.650		
Total	4,100.320	71			
Social Science 30					
Category Means	98.510	2	49.255	0.87	$p>.05$
Within Subgroups	2,726.824	48	56.809		
Total	2,825.334	50			

APPENDIX J

Table 82

Self-Insight. Analysis of Variance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	848.775	2	424.388	1.78	$p>.95$
Supplementary Discussion	116.046	3	38.682	0.16	$p>.05$
Interaction	1,581.292	6	263.549	1.11	$p>.05$
Within Subgroups	54,318.850	228	238.240		
Total	56,864.963	239			
Science 11					
Medium	315.508	2	157.754	0.77	$p>.05$
Supplementary Discussion	805.046	3	268.349	1.31	$p>.05$
Interaction	557.492	6	92.915	0.45	$p>.05$
Within Subgroups	46,633.250	228	204.532		
Total	48,311.296	239			
Psychology 10.1					
Category Means	566.615	3	188.872	1.42	$p>.05$
Within Subgroups	12,207.125	92	132.686		
Total	12,773.740	95			
English 6.1					
Category Means	580.528	2	290.264	1.89	$p>.05$
Within Subgroups	10,588.792	69	153.461		
Total	11,169.320	71			
Social Science 30					
Category Means	62.038	2	31.019	0.17	$p>.05$
Within Subgroups	9,501.000	51	186.294		
Total	9,563.038	53			
Creative Arts 10					
Category Means	4.069	1	4.069	0.03	$p>.05$
Within Subgroups	15,939.508	128	124.527		
Total	15,943.577	129			

APPENDIX K — Table 83

Attitude to Content. Analysis of Variance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	2,593.575	2	1,296.788	13.63	p<.01
Supplementary Discussion	153.348	3	51.116	0.54	p>.05
Interaction	1,149.880	6	191.647	2.01	p>.05
Within Subgroups	23,985.182	252	95.179		
Total	27,881.985	263			
Science 11					
Medium	260.389	2	130.194	0.96	p>.05
Supplementary Discussion	226.520	3	75.507	0.56	p>.05
Interaction	814.278	6	135.713	1.00	p>.05
Within Subgroups	32,481.810	240	135.338		
Total	33,782.997	251			
Psychology 10.1					
Category Means	1,345.879	3	448.626	2.16	p>.05
Within Subgroups	20,807.334	100	208.073		
Total	22,153.213	103			
English 6.1					
Category Means	955.410	2	477.705	2.55	p>.05
Within Subgroups	14,080.385	75	187.739		
Total	15,035.795	77			
Social Science 30					
Category Means	277.298	2	138.649	1.07	p>.05
Within Subgroups	6,987.685	54	129.402		
Total	7,264.983	56			
Creative Arts 10					
Category Means	116.363	1	116.363	0.74	p>.05
Within Subgroups	34,310.819	218	157.202		
Total	34,427.182	219			

APPENDIX L — Table 84

Attitude to Instructor. Analysis of Variance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	6,424.940	2	3,212.470	3.73*	p>.05
Supplementary Discussion	446.455	3	148.818	0.17*	p>.05
Interaction	5,172.726	6	862.121	6.50	p<.01
Within Subgroups	33,411.819	228	146.543		
Total	45,455.940	239			
Science 11					
Medium	1,184.985	2	592.492	4.15	p<.05
Supplementary Discussion	77.155	3	25.718	0.18	p>.05
Interaction	1,738.952	6	289.825	2.03	p>.05
Within Subgroups	34,245.905	240	142.691		
Total	37,246.997	251			
Psychology 10.1					
Category Means	455.948	3	151.983	3.22	p<.05
Within Subgroups	4,721.709	100	47.217		
Total	5,177.657	103			
English 6.1					
Category Means	1,994.256	2	997.128	7.50	p<.01
Within Subgroups	9,978.462	75	133.046		
Total	11,972.718	77			
Social Science 30					
Category Means	40.222	2	20.111	0.14	p>.05
Within Subgroups	8,621.715	60	143.695		
Total	8,661.937	62			
Creative Arts 10					
Category Means	3,108.768	1	3,108.768	15.57	p<.001
Within Subgroups	43,536.482	218	199.709		
Total	46,645.250	219			

*** Due to the significant value of F for interaction, the F for medium and supplementary methods were computed by the formula $F=\frac{\text{variance for medium}}{\text{variance for interaction}}$**

APPENDIX M

Table 85

Interest in Subject Matter. Analysis of Variance F-Ratios

Course and Source of Variation	Sum of Squares	df	Mean Square	F	p
Science 10					
Medium	6,697.727	2	3,348.863	13.57	$p<.01$
Supplementary Discussion	879.954	3	293.318	1.19	$p>.05$
Interaction	3,546.728	6	591.121	2.40	$p>.05$
Within Subgroups	62,203.091	252	246.838		
Total	73,327.500	263			
Science 11					
Medium	194.580	2	97.290	0.35	$p>.05$
Supplementary Discussion	449.790	3	149.930	0.55	$p>.05$
Interaction	529.388	6	88.231	0.32	$p>.05$
Within Subgroups	65,924.572	240	274.686		
Total	67,098.330	251			
Psychology 10.1					
Category Means	1,256.000	3	418.667	2.79	$p<.05$
Within Subgroups	15,127.847	104	151.278		
Total	16,383.847	107			
English 6.1					
Category Means	3,362.871	2	1,681.435	4.82	$p<.05$
Within Subgroups	26,147.347	75	348.631		
Total	29,510.218	77			
Social Science 30					
Category Means	473.087	2	236.543	0.99	$p>.05$
Within Subgroups	12,930.843	54	239.460		
Total	13,403.930	56			
Creative Arts 10					
Category Means	705.618	1	705.618	1.97	$p>.05$
Within Subgroups	77,912.910	218	357.399		
Total	78,618.528	219			

APPENDIX N

Table 86

Chi-Square Comparisons by Media of Instruction on Expectations of Amount to be Learned (Question 1) Pre-Course Results

Comparison and Course	Chi-Square	Statistically Significant	Students Favored
TV at Home vs. TV on Campus			
Science 10	16.1	Yes (.005)***	At Home
Psychology 10.1	11.7	Yes (.005)***	On Campus
English 6.1	8.9	Yes (.025)*	At Home
TV at Home vs. Control			
Science 10	46.7	Yes (.005)***	Control
Psychology 10.1	128.9	Yes (.005)***	Control
English 6.1	31.0	Yes (.005)***	Control
Social Science 30	59.9	Yes (.005)***	Control
Creative Arts 10	9.3	Yes (.01)**	At Home
TV on Campus vs. Control			
Science 10	78.0	Yes (.005)***	Control
Psychology 10.1	77.1	Yes (.005)***	Control
English 6.1	53.5	Yes (.005)***	Control

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*Significant beyond the 2.5% level.
**Significant beyond the 1% level.
***Significant beyond the .5% level.

Table 87

Chi-Square Comparisons by Media of Instruction on Realization of Amount Learned (Question 1). Post - Course Results

Comparison and Course	Chi-Square	Statistically Significant	Students Favored
TV at Home vs. TV on Campus			
Science 10	3.9	No	Neutral
Science 11	10.8	Yes (.005)**	At Home
Psychology 10.1	41.0	Yes (.005)**	At Home
English 6.1	12.0	Yes (.005)**	At Home
TV at Home vs. Control			
Science 10	62.5	Yes (.005)**	Control
Science 11	53.6	Yes (.005)**	Control
Psychology 10.1	8.6	Yes (.025)*	Control
English 6.1	59.0	Yes (.005)**	Control
Social Science 30	56.5	Yes (.005)**	Control
Creative Arts 10	12.9	Yes (.005)**	Control
TV on Campus vs. Control			
Science 10	74.0	Yes (.005)**	Control
Science 11	93.3	Yes (.005)**	Control
Psychology 10.1	73.6	Yes (.005)**	Control
English 6.1	108.8	Yes (.005)**	Control

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*Significant beyond the 2.5% level.
**Significant beyond the .5% level.

Table 88

Comparisons of Expectation with Realization on Amount Learned (Question 1) by Media of Instruction. Pre-Post Results

Medium and Course	Chi-Square	Statistically Significant	Student Expectation at Course End
Control			
Science 10	2.6	No	No Change
Psychology 10.1	40.0	Yes (.005)**	Lower
English 6.1	2.8	No	No Change
Social Science 30	5.2	No	No Change
Creative Arts 10	7.5	Yes (.05)*	Higher
TV at Home			
Science 10	11.5	Yes (.005)**	Lower
Psychology 10.1	32% Gain in "More" Category		Higher
	10% Gain in "Less" Category		
English 6.1	7% Gain in "More" Category		
	20% Gain in "Less" Category		Lower
Social Science 30	20.1	Yes (.005)**	Lower
Creative Arts 10	14.1	Yes (.005)**	Lower
TV on Campus			
Science 10	4% Gain in "More" Category		No Change
	7% Gain in "Less" Category		
Psychology 10.1	10.7	Yes (.005)**	Lower
English 6.1	3.1	No	No Change

Note.—In some instances both "More" and "Less" Categories gained; this made Chi-Square an illogical statistic. Hence it does not appear in some cells; instead, the particular per cents are entered.

* Significant beyond the 5% level.
** Significant beyond the .5% level.

Table 89

Chi-Square Comparisons of Post Results for Science 10 with Post Results for Science 11 on Amount Learned (Question 1)

Medium	Chi-Square	Statistically Significant	Student Expectation
TV at Home	0.7	No	No Change
TV on Campus	7.2	Yes (.05)*	Lower

*Significant beyond the 5% level.

Table 90

Chi-Square Comparison by Media of Instruction on Attention (Question 2). Pre-Course Results

Comparison and Course	Chi-Square	Statistically Significant	Students Favored
TV at Home vs. TV on Campus			
Science 10	9.7	Yes (.01)*	At Home
Psychology 10.1	11.9	Yes (.005)**	On Campus
English 6.1	16.9	Yes (.005)**	At Home
TV at Home vs. Control			
Science 10	48.2	Yes (.005)**	Control
Psychology 10.1	17.8	Yes (.005)**	Control
English 6.1	24.3	Yes (.005)**	Control
Social Science 30	0.6	No	Neutral
Creative Arts 10	10.9	Yes (.005)**	At Home
TV on Campus vs. Control			
Science 10	90.4	Yes (.005)**	Control
Psychology 10.1	1.7	No	Neutral
English 6.1	62.6	Yes (.005)**	Control

*Significant beyond the 1% level.
**Significant beyond the .5% level.

Table 91

Chi-Square Comparisons by Media of Instruction on Attention (Question 2) Post Course Results

Comparison and Course	Chi-Square	Statistically Significant	Students Favored
TV at Home vs. TV on Campus			
Science 10	3.4	No	Neutral
Science 11	24.8	Yes (.005)*	At Home
Psychology 10.1	12.3	Yes (.005)*	At Home
English 6.1	9.5	Yes (.01)**	At Home
TV at Home vs. Control			
Science 10	57.4	Yes (.005)*	Control
Science 11	28.5	Yes (.005)*	Control
Psychology 10.1	47.6	Yes (.005)*	Control
English 6.1	59.0	Yes (.005)*	Control
Social Science 30	13.2	Yes (.005)*	Control
Creative Arts 10	11.9	Yes (.005)*	Control
TV on Campus vs. Control			
Science 10	82.0	Yes (.005)*	Control
Science 11	90.5	Yes (.005)*	Control
Psychology 10.1	86.5	Yes (.005)*	Control
English 6.1	99.7	Yes (.005)*	Control

* Significant beyond the .5% level.
** Significant beyond the 1% level.

Table 92

Comparisons of Expectations with Realization on Attention (Question 2) by Media of Instruction. Pre-Post Results

Medium	Chi-Square	Statistically Significant	Student Expectation at Course End
Control			
Science 10	0.3	No	No Change
Psychology 10.1	12.2	Yes (.005)***	Higher
English 6.1	10.3	Yes (.01)**	Higher
Social Science 30	7.7	Yes (.025)*	Higher
Creative Arts 10	1.2	No	No Change
TV at Home			
Science 10	0.9	No	No Change
Psychology 10.1	2.5	No	No Change
English 6.1	6.6	No	No Change
Social Science 30	4.6	No	No Change
Creative Arts 10	16.0	Yes (.005)***	Lower
TV on Campus			
Science 10	2.4	No	No Change
Psychology 10.1	36.8	Yes (.005)***	Lower
English 6.1	3.1	No	No Change

*Significant beyond the 2.5% level.
**Significant beyond the 1% level.
***Significant beyond the .5% level.

Table 93

Chi-Square Comparisons of Post Results for Science 10 with Post Results for Science 11 on Attention (Question 2)

Medium	Chi-Square	Statistically Significant	Student Expectation
TV at Home	4.5	No	No Change
TV on Campus	1.3	No	No Change

Table 94

Chi-Square Comparisons by Media of Instruction on Preparation (Question 4). Pre-Course Results

Comparison and Course	Chi-Square	Statistically Significant	Students Favored
TV at Home vs. TV on Campus			
Science 10	1.9	No	Neutral
Psychology 10.1	0.5	No	Neutral
English 6.1	12.1	Yes (.005)*	At Home
TV at Home vs. Control			
Science 10	1.3	No	Neutral
Psychology 10.1	4.3	No	Neutral
English 6.1	16.7	Yes (.005)*	Control
Social Science 30	2.0	No	Neutral
Creative Arts 10	1.9	No	Neutral
TV on Campus vs. Control			
Science 10	3.0	No	Neutral
Psychology 10.1	3.2	No	Neutral
English 6.1	13.6	Yes (.005)*	Control

*Significant beyond the .5% level.

Table 95

Chi-Square Comparisons by Media of Instruction on Preparation (Question 4). Post-Course Results

Comparison and Course	Chi-Square	Statistically Significant*	Students Favored
TV at Home vs. TV on Campus			
Science 10	15.7	Yes	At Home
Science 11	7.6	Yes	At Home
Psychology 10.1	15.8	Yes	At Home
English 6.1	22.6	Yes	At Home
TV at Home vs. Control			
Science 10	12.0	Yes	Control
Science 11	27.9	Yes	Control
Psychology 10.1	25.3	Yes	Control
English 6.1	52.0	Yes	Control
Social Science 30	53.9	Yes	Control
Creative Arts 10	71.5	Yes	Control
TV on Campus vs. Control			
Science 10	48.2	Yes	Control
Science 11	56.6	Yes	Control
Psychology 10.1	63.1	Yes	Control
English 6.1	95.7	Yes	Control

*All results were statistically significant at the .5% level.

APPENDIX O

Table 96

Number of Written Descriptions by Subject Groups

Subject Group	N	TV		Conventional Class	
		Effective	Ineffective	Effective	Ineffective
College Students					
Experimental	379	757	746	807	509
Control	218	0	0	416	332
Instructors	25	58	43	43	26
High School Students	211	256	276	203	151
Total	833	1071	1065	1469	1018

Table 97

Comparisons of Groups by Per Cent of Responses in Sub-Categories A-U (Effective Classroom)

Sub-Category Group	Per Cent	Chi-Square	P
A Teacher Initiated Behavior		15.25	p<.01
Experimental	.26		
Control	.34		
High School	.17		
Teachers	.33		
B Student Initiated Behavior		8.20	p<.05
Experimental	.24		
Control	.15		
High School	.18		
Teachers	.11		
C Student-Teacher Interaction		5.58	p>.05
Experimental	.12		
Control	.11		
High School	.12		
Teachers	.25		
D Class Interaction		2.51	p>.05
Experimental	.25		
Control	.20		
High School	.21		
Teachers	.22		
E Method or Material		11.04	p<.05
Experimental	.08		
Control	.13		
High School	.05		
Teachers	.04		
F Physical Aspects		.00	p>.05
Experimental	.00		
Control	.00		
High School	.00		
Teachers	.00		
U Unusable		83.76	p<.001
Experimental	.05		
Control	.07		
High School	.27		
Teachers	.05		

Table 98

Comparisons of Groups by Per Cent of Responses in Sub-Categories A-U (Ineffective Classroom)

Sub-Category Group	Per Cent	Chi-Square	P
A Teacher Initiated Behavior		31.07	p<.001
Experimental	.30		
Control	.47		
High School	.21		
Teachers	.21		
B Student Initiated Behavior		4.35	p>.05
Experimental	.16		
Control	.17		
High School	.11		
Teachers	.09		
C Student-Teacher Interaction		15.08	p<.01
Experimental	.14		
Control	.15		
High School	.04		
Teachers	.12		
D Class Interaction		10.44	p<.05
Experimental	.13		
Control	.09		
High School	.08		
Teachers	.26		
E Method or Material		2.04	p>.05
Experimental	.06		
Control	.00		
High School	.03		
Teachers	.03		
F Physical Aspects		14.28	p<.01
Experimental	.03		
Control	.03		
High School	.03		
Teachers	.12		
U Unusable		93.24	p<.001
Experimental	.21		
Control	.09		
High School	.51		
Teachers	.17		

Table 99

Comparisons of Groups by Per Cent of Responses in Sub-Categories A-U (Effective Television)

	Sub-Category Group	Per Cent	Chi-Square	p
A	Teacher Initiated Behavior		13.69	$p<.01$
	Experimental	.23		
	High School	.36		
	Teachers	.42		
B	Student Initiated Behavior		28.87	$p<.001$
	Experimental	.20		
	High School	.05		
	Teachers	.12		
C	Student-Teacher Interaction		.00	$p>.05$
	Experimental	.00		
	High School	.00		
	Teachers	.00		
D	Class Interaction		.11	$p>.05$
	Experimental	.04		
	High School	.04		
	Teachers	.05		
E	Method or Material		2.17	$p>.05$
	Experimental	.33		
	High School	.35		
	Teachers	.23		
F	Physical Aspects		5.73	$p>.05$
	Experimental	.13		
	High School	.08		
	Teachers	.15		
U	Unusable		28.61	$p<.001$
	Experimental	.07		
	High School	.12		
	Teachers	.03		

Table 100

Comparisons of Groups by Per Cent of Responses in Sub-Categories A-U (Ineffective Television)

	Sub-Category Group	Per Cent	Chi-Square	p
A	Teacher Initiated Behavior		7.55	$p<.05$
	Experimental	.25		
	High School	.16		
	Teachers	.25		
B	Student Initiated Behavior		3.77	$p>.05$
	Experimental	.10		
	High School	.06		
	Teachers	.09		
C	Student-Teacher Interaction		.00	$p>.05$
	Experimental	.00		
	High School	.00		
	Teachers	.00		
D	Class Interaction		2.53	$p>.05$
	Experimental	.09		
	High School	.11		
	Teachers	.04		
E	Method or Material		1.59	$p>.05$
	Experimental	.12		
	High School	.13		
	Teachers	.06		
F	Physical Aspects		.59	$p>.05$
	Experimental	.41		
	High School	.42		
	Teachers	.48		
U	Unusable		22.45	$p<.001$
	Experimental	.03		
	High School	.12		
	Teachers	.08		

List of Critical Incidents

Effective Television

A. Teacher-Initiated Behavior

Teacher played song on teeth with pencil — students enjoyed this informal behavior.

Teacher's sense of humor and enthusiasm.

Teacher used funny stories to support point.

Teacher personalized the material (applied material to personal lives of students).

Teacher's lecture opened up new ideas to student.

Teacher directed where to look for details.

Teacher at ease in presentation and is informal in gesture and example.

Teacher injected a personal experience and relieved boredom.

Teacher relaxed and this relaxed student.

Teacher better organized (down to basic content).

Teacher stimulated student to become interested in subject.

Teacher gave summary and this was helpful in understanding the material.

Teacher presented subject dramatically.

Teacher inspired and put himself into his lecture.

Teacher repeated material over again.

Teacher brought in people of different disciplines to examine the subject from their views.

Discussion between lecturers held attention.

Teacher realized problem area and emphasized explanation.

Teacher had organized presentation of materials and diagrams.

Teacher created feeling of personal contact.

Teacher holds student's attention easier on television.

Teacher clarified material (poem) in discussion on television.

Teacher prepared for television lectures; covers more material and more information given.

B. Student-Initiated Behavior.

Student able to relate subject matter to self as a person.

Through watching course on Art, student able to understand paintings in Art Show.

Student had more time for study.

Student can leave or "turn off" set whenever he feels like it without feeling guilty.

Student completed assignment in spite of confusion from presentation on television.

Student taking course on television learned more than fellow student in conventional classroom.

Student discussed material with friend before telecast; made lecture understandable.

Student feels relaxed, is alone and able to eat, smoke, etc.

Student is relaxed, free from pressure and in a quiet environment.

Student was familiar with material presented; therefore understood it.

Student doesn't have to worry about teacher questioning.

Student relaxed because no physical contact with instructor.

Helped student (and family) understand birth process.

Student can take notes.

Student able to take care of emergency and still see class.

Student derives more pleasure from instructor's personality than from course content.

Student did not fall behind while sick at home.

Student could perform the suggested movements at home without feeling self-conscious.

Student understood terms and felt he would succeed in the course.

Student able to do other things at same time.

Student had new insights of old experiences.

Student found he would pay more attention to television.
Student understood every point of discussion.

C. Student-Teacher Interaction

D. Class Discussion or Interaction

Student discussant describes other material which gives student incentive to read material himself.
Student discussants on television gave views different from viewer and latter re-examined his views and the material in more detail.
Discussions on television helped clarify material in an interesting manner.
Students on television relaxed; helps viewer to be relaxed at home.

E. Application of Course Material or Method

Entertainment value of illustrations.
Trick photography and camera work to emphasize the meaning of a term.
Poet's picture shown while his recorded voice recited his work.
Demonstrations more professional and better organized than in classroom.
Steady and somewhat slow pace helped to take notes with no difficulty.
Costuming helped to increase effectiveness of course.
Syllabus helped student to be aware of where he stood at all times.
Effective use of visual aids accompanying lecture.
Demonstrations and skits effectively used in lowering levels of abstraction and place student closer to experience.
Girl dramatically illustrating point of poem was impressive.
Movie helped clarify meaning of words and organization of composition.
Board writing helped clarify points discussed.

F. Physical Aspects of the Teaching-Learning Process

Student able to tape record the lecture and not miss anything by sleeping.
Class size does not affect course via television.
Use of close-up shots helps to clarify.
Class begins and ends on time.
Material made understandable over television.
Novelty and difference of television held attention and time went quickly.
No distractions; helpful to learning.
Student can share learning with family and friends who also watched.
Easier to concentrate because there are no interruptions as in classroom.
Television class controlled and did not wander off subject.
Disturbing materials not in same room with student.
Student gets closer look at details of real people.

G. Miscellaneous.

Ineffective Television

A. Teacher-Initiated Behavior

Teacher did not hold student's attention when he lectured.
Teacher gave assignment too fast and did not repeat.
Teacher gives too many examples for student to take adequate notes.
Teacher lectured too rapidly.
Inter-change among teachers too rapid and confusing.
Teacher did not explain the differences in examples given, but left it up to student to figure out.
Teacher does not describe ideas fully.
Teacher unable to perceive student's reactions and doesn't know when students are unclear.
Teachers tried to act rather than lecture.
Teachers unaware of their own inability.
Teacher impersonal in his attitude.
Teacher constantly referred to notes.
Teacher shifted topic without preparing student.
Teacher did not define or explain unfamiliar terms.
Teacher appeared uncomfortable, ill at ease and uncertain, and this was communicated to the students.
Teacher presented material in unorganized manner with no constructive suggestions.

B. Student-Initiated Behavior

Student felt unidentified with instructor and was disinterested in material presentation.
Lack of personal contact.
Student became inattentive when instructors were changed.
Student feels insignificant when he is unable to express his views at time they are pertinent.
Feeling of no accomplishment.
Student felt he lost something of importance because he did not understand words and phrases used.
Student felt need to express his views on conflicting material and frustrated by being unable to do so.
Student felt uncomfortable because teacher nervous on television.
Student unable to participate actively in discussion.

C. Student-Teacher Interaction

D. Class Discussion or Interaction

Panel discussion stiff, and meaningless statements made.
Students noisy and uncontrolled during the telecast because of no proctor.
Discussion on panel lagged too much.
Hearing what others learned in their discussion groups disturbing.
Discussants did not explain materials in terms the student understood.
Panel interaction confusing.
Student discussants on television so competent that they made the viewer feel inferior.
Panelists discussed material superficially.
Panel discussion unrelated to audience.
Questions asked by student discussants on television left unanswered.

E. Application of Course Material or Method

Material presented was uninteresting and confusing.
Material presented in long, drawn out conversation.
Too much material presented at one time.
Material presented unfamiliar and beyond student's experience and preparation.
Material presented was too elementary.
Skits presented were over-dramatized.
Material presented with no demonstration.

F. Physical Aspects of the Teaching-Learning Process.

Handwriting on board too small to read.
Questions pertinent at time of television presentation forgotten by time discussion group meets.
Difficulty in taking notes during television presentation.
Lack of opportunity to ask questions resulted in feeling of boredom and loss of value in program.
Television camera moves too quickly from visual material for student to copy or understand.
Mechanical difficulties resulting in poor reception.
Cannot understand material because learning is under new and different conditions.
Too easy to forget to turn on the television set.
Student unable to see colors and shading on illustrations.
People entering and leaving viewing room distracting and hinders learning.
Course interrupted and interferred with by distractions, e.g., phone, friends, etc.
Camera could not include all material on board in one shot.
Lack of opportunity to question teacher hinders understanding.
Student unable to ask teacher to repeat.
Television set removes instructor's control over student.
Material open to question and debate but cannot be done by television.

G. Miscellaneous.

Effective Classroom

A. Teacher-Initiated Behavior

Teacher able to give personal help—individualize instruction.
Teacher is good speaker and holds student's interest.
Teacher explained clearly and in detail.
Teacher opened new insights for the student.
Teacher guided thinking into right direction and showed students what to look for.

Teacher relaxes and creates atmosphere for student participation and learning.
Teacher uses personal experience and his own interest as examples.
Teacher more relaxed and gives more.
Teacher forced attention—helpful and stirs up enthusiasm.
Teacher talked at students' level, applying the material to their own experiences.
Teacher answered all the questions student asked.
Teacher's rapid presentation forced student to work actively at understanding material.
Teacher did not have to refer to notes.
Teacher's willingness to go off the subject once in a while.
Teacher confided in the class and presented material in a friendly manner, making students feel self-confident.
Teacher's questions posed so that they require specific answers.

B. Student-Initiated Behavior

The feeling of mastery of the subject.
Student likes being able to ask questions on the spot and gets a better understanding from immediate answers.
Students practiced learning the details of material.
Chance to voice own opinion.
Student rewarded for discussing and performing well in class (student-initiated behavior was rewarded).
Students able to ask for clarification, either directly or through questions of others.
The feeling of experiencing reality is comforting.
Student initiates subject or topic, either from personal experience or on point overlooked.
Teacher able to tell how he is doing from class reaction, and can repeat if necessary.
Teacher distributes available time well, covering all the material, and is never pressed for time.
Teacher's human frailty (blushing) appreciated by class.
Teacher effectively used humor to relieve tension or to help in clarification of subject.

C. Student-Teacher Interaction

Classroom atmosphere is free and student is not afraid to say or ask anything.
When an idea is unclear, the teacher is there to clarify.
Personal contact enabled student to change conflicting test date.
Give and take between student and teacher increases interest.
Student gets to know teacher as a person.
Student feels inadequate in his participation — instructor initiates questions and this helps student.
Student feels the teacher is interested in him.
Personal contact with teacher is comforting and helps learning.

D. Class Discussion or Interaction

Class discussion is enjoyable and student feels he is part of the discussion.
In classroom discussions, atmosphere more personal.
Class discussion of student's paper and participation of instructor helped him to understand better.
Students participated in shaping and building class material.
Even class discussion on digressing material helpful.
Discussing details helps person to feel he grows.
Students asked and answered their own questions — resulted in a broadening of the material.
Student feels personal interaction is necesary in some courses.
Seeing that other students were having same problem relieved student's embarrassment.
Student was able to see that, by comparison, she was better than other students in the course.
Get to know students better and helps in meeting people.
Class discussion keeps class' attention.
Instructor was called away but class continued its discussion and study.
Class discussion was itself a practical demonstration of what was being studied.
More advanced students assisted less advanced students in their progress.
Class discussion that is timely and pertinent is important.
Class discussion assures correctness of ideas.
Class discussion brought up new ideas and ways of thinking to student.
Student learns through discussions. Discussion helps in clarification and is interesting.
Student's frankness and earnestness in participation relieved class tension and led others to discuss frankly.

E. Application of Course Material or Method

Teacher uses diagrams and visual aids to support talk.
Supplementary material help clarify reading.
Effective use of visual aids (demonstrations, movies, etc.).
First hand experiences help learning.
Course outline adhered to makes student feel secure.
Novelty of course material.
Going over papers turned in helped in applying corrective action.
Novelty of method.

F. Physical Aspects of the Teaching-Learning Process

G. Miscellaneous

Ineffective Classroom

A. Teacher-Initiated Behavior

Teacher unable to hold attention of students who talk.
Teacher acts nervous.
Teacher presented too much material in a short time.
Teacher did not explain his terms and was confusing.
Teacher skipped from one subject to another and student felt something was missing.
Teacher constantly referred to notes and read them.
Teacher does not clarify what he expects from assignments.
Teacher goes too fast to take adequate notes.
Teacher gave unclear presentation and too fast.
Teacher did not repeat any of his material in his lecture.
With highly controversial material, teacher gave only his views and would not hear student's views.
Teacher would not allow controversial speaker.
Teacher asks questions in such a traumatic way that the class freezes.
Teacher creates an unrelaxed, pressured climate.
Teacher discourteous in controlling class.
Teacher talks about sex (masturbating) in mixed class — embarrassed student.
Teacher accused student of not doing own work.
Teacher threw questions back to students when asked.
Teacher prevents student from developing individual style of expression.
Lecture leaves too many debatable questions unanswered.
Teacher spent too much time trying to justify course.
In advanced class, teacher started with beginning material again.
Teacher lacks control in class.
Teacher took whole period to answer one question.
Vulgar words or remarks made by teacher.
Teacher tenuously explained answer to another's question which student already knew.
Teacher humiliates student.
Teacher did not come to class.
Teacher did not complete showing interesting slides.
Teacher talks in a dull monotone.
Teacher's speech hard to understand.
Classroom instruction lags.
Classroom instruction sometimes too rigorous.
Teacher doesn't cover text material.
Listed criteria for grading (points) apparently not used by grader.
Teacher makes excessive demands for participation and attention —unnerving.
Questions answered indirectly by teacher are more confusing than clarifying.
Teacher does not lecture, but makes students talk on material they don't know.
Instructor did not write new and unfamiliar words in lecture on board.
Teacher goes more by book than own knowledge.
Teacher forgot assignment he made and changed plan.
Teacher reads grades publicly in class.
Teacher unprepared in his lecture.
Teacher arrived late to class.
Teacher showed movies without class discussion of them.
Teacher limits number of questions.
Instructor gave assignment irrelevant to student—result: improperly done.

Teacher is unwilling to change her view but expects students to do changing.
Teacher writes illegibly on board and talks at same time.
Teacher strays from subject matter.
Unvaried lecturing day after day.
Teacher organized his material so that student was unable to identify important points.
Teacher disorganized in presentation.

B. Student-Initiated Behavior

Questions raised in student's mind during lecture forgotten by time discussion group meets.
Student learned nothing new.
Student feels less competent because he does not understand material in lecture.
Uninteresting lecture led student's attention to wander and feeling of boredom.
Student embarrassed about being singled out in class to recite and answer questions.
Student upset because test was not returned soon enough.
Student dislikes surprise tests.
Student feels confined and unable to leave class.
Student dislikes being exposed when unprepared.
Student feels he disturbs instructor by his behavior (blowing nose, etc.).
Student unable to see relevancy of what he is doing.
Student felt he did not do well on test.
Student misses some important notes in discussion class.
Student feels instructor teaches the irrelevancies of the course.
Student feels he is being treated like a child.

C. Student-Teacher Interaction

Students lead instructor away from the course subject.
Questions were left unanswered and forgotten.
Not enough student-teacher relationship.
Student dislikes close contact with teacher.
Student stuck and unable to answer when teacher called on him.
Student blocked from participating in answering teacher's question.
Teacher accused student of not listening when student asked question about material not understood.
Paper was lost after student turned it in.

D. Class Discussion or Interaction

Disinterested students disrupt, causing teacher to stop and police the room.
Irrelevant questions and comments by other students waste class time.
Class discussion uses up too much time and class gets behind schedule.
No class participation.
Students parrot instructor in discussion; not their own ideas.
Students, rather than instructor, answered student's questions.
Class not considerate and does not listen when student has a question.
Students ask unnecessary questions and distract others.
Students talk too much.
Awareness of other students in the room is distracting.
Discussion class presents lack of cohesion of material.
Discussion conflicted with lecture material.
Disruptive students are distracting.
Class discourteous and rude toward teacher.
Class schedule upset by unprepared students.
One student monopolizes class period with unnecessary questions.
Class gets restless at end of hour and this distracts from the instructor's point.
Class discussion wanders.
Purpose of panel discussion diverted.
Class discussion does not resolve issues and ends in conflict.

E. Application of Course Material or Method

Not enough visual aids.
Methods used in a previous course not applicable and student is confused.
Teacher didn't use effective illustrative material to clarify subject matter.
Lecture and text-reading material unrelated; test given on both.

F. Physical Aspects of the Teaching-Learning Process

In large class, question from students hard to hear and student feels lost.
Too dark in class to take notes.
Material on blackboard hard to read and drawings could not be seen.
Large size of class makes course seem mechanical and cold.
Classroom too big.
Not enough time allotted for an exam.
Classroom time too short (unable to cover material).
Unable to hear instructor in large class.
Interruptions in classroom.
Too many physical distractions (phone).

G. Miscellaneous